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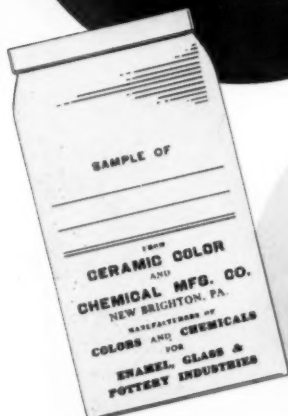
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VOL. 7 • NO. 1



LONDON GUARANTEE BUILDING
Michigan Avenue at Wacker Drive
THE HOME OF

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MONTHLY TRADE PUBLICATION

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A trade publication devoted to the interests of the manufacturers of major home appliances and allied metal products. Covers plant facilities and manufacturing problems from raw metal to safe delivery of the finished product, with special emphasis on metal finishing.

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DANA CHASE PUBLICATIONS
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	Page
SEVENTEENTH ANNUAL MEETING OF COOKING AND HEATING APPLIANCE MANUFACTURERS	19
DEEP DRAWING OF RECTANGULAR AND ROUND SHELLS by William P. Von Behren	23
THE HOT SPRAY PROCESS FOR ORGANIC FINISHES by James A. Bede	25
ADHERENCE OF SHEET STEEL GROUND COATS AS INFLUENCED BY TITANIA MILL ADDITIONS by Leonard Witt and R. M. King	28
THE NATIONAL SAFE TRANSIT PROGRAM — A Special Section	31
EMULSION AND ALKALINE CLEANING by A. J. Holloway ..	53

FEATURES

THE FINISH LINE — An Editorial	17
SAFE TRANSIT COMMITTEE PERSONNEL	40, 41 & 42
WHAT THEY SAY ABOUT THE SAFE TRANSIT PROGRAM	43
SNAPSHOTS AT ICHAM MEETING — finishfotos	66 & 67

INDUSTRIAL NEWS

LIST OF FIRST MANUFACTURERS CERTIFIED TO USE THE SAFE TRANSIT LABEL ..	44
INDUSTRY NEWS AND PERSONALS	57
AHLMA ANNOUNCES CALENDAR OF 1950 EVENTS	57
FIRST UNITED STATES INTERNATIONAL TRADE FAIR	60
LIST OF FIRST CERTIFIED SAFE TRANSIT LABORATORIES	80

MISCELLANEOUS

ADVERTISERS' INDEX	78
CLASSIFIED ADVERTISING	78

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DANA CHASE PUBLICATIONS
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HOMEFURNISHINGS MARKET BOOKINGS INDICATE HIGH PRODUCTION FOR 1950.....	19
PRODUCTION OF CUSTOM-BUILT NEON SIGNS AND ARCHITECTURAL PANELS by W. A. Barrows.....	23
THE EVOLUTION OF DEEP DRAWING LUBRICANTS by G. A. Cairns.....	27
SILICONES IN THE PROTECTIVE COATING INDUSTRY by John J. Tyner.....	30
A TORSION TEST FOR ENAMELED STEEL	44

FEATURES

FROM THE EDITOR'S MAIL	8
THE FINISH LINE — An Editorial	17
SNAPSHOTS OF AHLMA MEMBERS — finishfotos	36 & 37
HUGE OUTDOOR MURAL — A Panorama of the Old West	42 & 43

INDUSTRIAL NEWS

ANNUAL MEETING OF HOME LAUNDRY MANUFACTURERS	35
FOURTH NATIONAL HOME LAUNDRY CONFERENCE	41
INDUSTRY NEWS AND PERSONALS	47
HOW ONE COMPANY SELLS SAFE TRANSIT PROGRAM	62

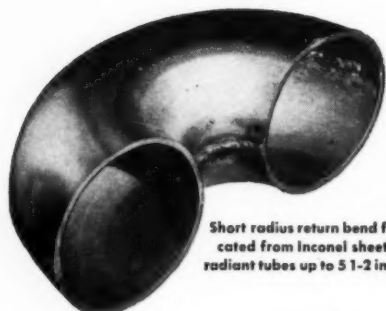
MISCELLANEOUS

NEW SUPPLIES AND EQUIPMENT	56
NEW INDUSTRIAL LITERATURE	56
ADVERTISERS' INDEX	70
CLASSIFIED ADVERTISING	70

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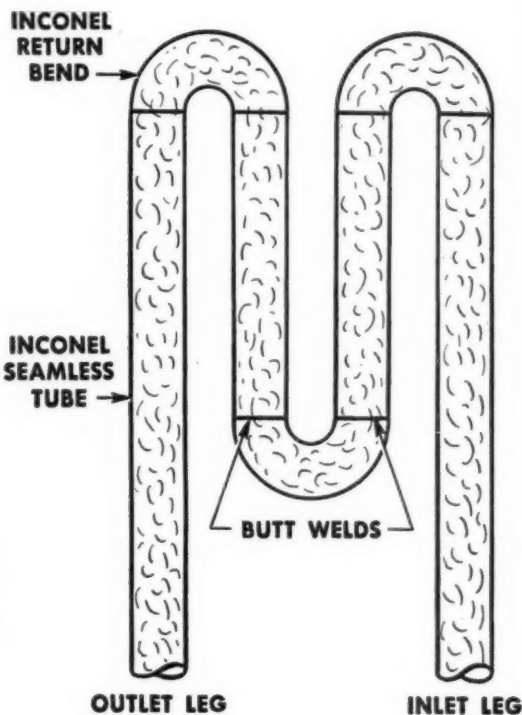
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DANA CHASE PUBLICATIONS
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	Page
PACKAGING FOR EXPORT—ANOTHER LESSON IN APPLIANCE PROTECTION by J. Gardner Crowell....	19
THE SIGNIFICANCE OF WATER IN INDUSTRIAL PROCESSES by F. H. Kahler and J. F. Wantz.....	23
ELECTRICAL MEASUREMENTS ON METAL PROTECTIVE PAINTS by W. E. Shaw and D. L. Hawke...	26
RANGE PRODUCTION FROM RAW MATERIAL TO SHIPPING DOCK by Gerald Eldridge Stedman.....	33

FEATURES

FROM THE EDITOR'S MAIL	6
THE FINISH LINE—An Editorial	17
VANCOUVER INSTALLATION EMPHASIZES VERSATILITY OF ARCHITECTURAL PORCELAIN ENAMEL	30
LAYOUT OF PLANT DESIGNED TO PRODUCE 400 RANGES PER DAY	40 & 41

INDUSTRIAL NEWS

SIGN MEN HOLD ANNUAL MEETING	44
INDUSTRY NEWS AND PERSONALS	49
USING AN INFRA-RED SYSTEM FOR DEGREASING	57

MISCELLANEOUS

NEW SUPPLIES AND EQUIPMENT	58
NEW INDUSTRIAL LITERATURE	58
ADVERTISERS' INDEX	78

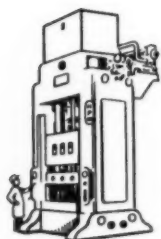
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DANA CHASE PUBLICATIONS
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	Page
USING CERAMIC COATINGS FOR SPECIALIZED APPLICATIONS by Walter Rudolph.....	19
HOW ONE FIRM REDUCED DEGREASING AND FINISHING COSTS by W. L. Gwizdowski.....	22
FILTERING AND STRAINING PAINTS AND VARNISHES by A. C. Kracklauer.....	24
SAFE TRANSIT—A MUST FOR HOME APPLIANCES CARLOADING METHODS—Part 1	27
PRECISION PORCELAIN by R. A. Weaver, Jr.	42
COLD EXTRUSION OF STEEL by Col. Merle H. Davis.....	47
TITANIUM ENAMEL DIRECT TO TITANIUM STEEL by J. B. Simons	58

FEATURES

FROM THE EDITOR'S MAIL.....	6
THE FINISH LINE—An Editorial.....	17

INDUSTRIAL NEWS

PRESSED METAL INSTITUTE SPONSORS TECHNICAL SYMPOSIUM.....	40
ENAMEL DIVISION PROGRAM FOR A.C.S. ANNUAL MEETING.....	45
AMA PACKAGING EXPOSITION IN CHICAGO, APRIL 24-27	64
PACIFIC COAST ENAMELERS DISCUSS COLOR-MATCHING by Malden Grange Bishop.....	70
MORE COMPANIES JOIN SAFE TRANSIT PROGRAM.....	80

MISCELLANEOUS

NEW SUPPLIES AND EQUIPMENT.....	77
ADVERTISERS' INDEX	78
CLASSIFIED ADVERTISING	78

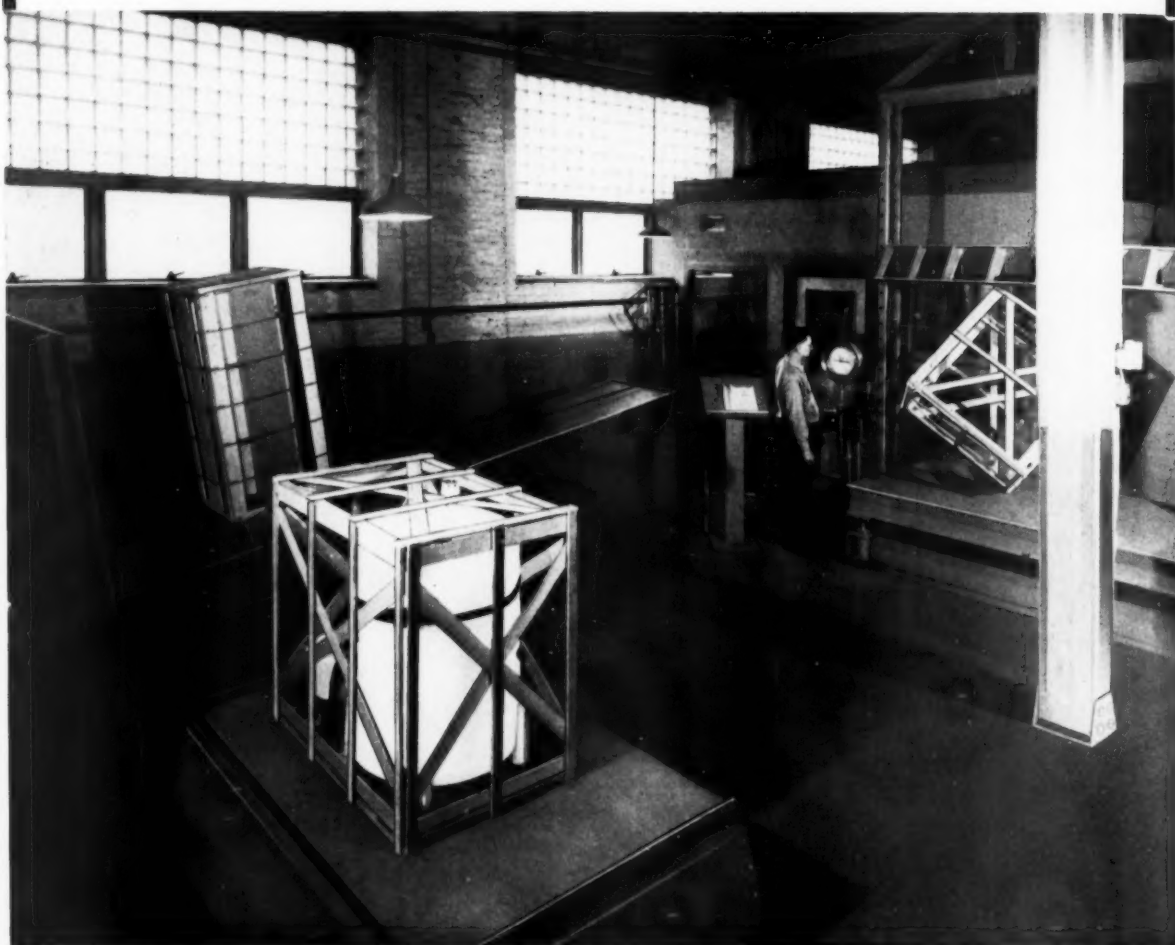
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	Page
AN EFFICIENT PRODUCTION LINE FOR ICE CREAM CABINETS by Dr. William Mikulas.....	19
AVOIDING ENAMEL DIFFICULTIES THROUGH PROPER FURNACE OPERATION—Part 1 by M. Bozsini.....	25
FILTERING PRACTICE FOR PLATING SOLUTIONS by K. L. Carr.....	29
SAFE TRANSIT CASE HISTORIES.....	39
CARLOADING METHODS—Part 2.....	43

FEATURES

THE FINISH LINE—An Editorial.....	15
THE SUGGESTION BOX.....	28
SNAPSHOTS OF PMI MEMBERS.....	40 & 41
SAFE TRANSIT LETTERS.....	60

INDUSTRIAL NEWS

EDISON ELECTRIC INSTITUTE HOLDS ANNUAL SALES CONFERENCE.....	32
REFRIGERATION EQUIPMENT MEN HOLD ANNUAL MEETING.....	37
INDUSTRY NEWS AND PERSONALS.....	53
COMPANIES COOPERATING IN SAFE TRANSIT PROGRAM.....	72
CURTAIN WALL CONSTRUCTION FOR CHICAGO BUILDING.....	80

MISCELLANEOUS

NEW SUPPLIES AND EQUIPMENT.....	50
INSULATING RECIRCULATING HEATING SYSTEMS.....	75
ADVERTISERS' INDEX.....	78

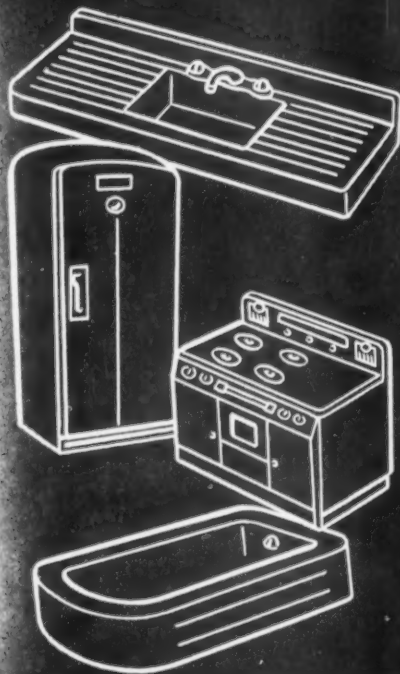
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DANA CHASE PUBLICATIONS
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	Page
THE INDUCTION HEATER AS A TOOL IN FABRICATION by Gilbert C. Close.....	19
AVOIDING ENAMEL DIFFICULTIES THROUGH PROPER FURNACE OPERATION — Part II by M. Bozsini.....	22
FILTRATION FOR NICKEL AND NEUTRALIZER SOLUTIONS by Harold W. Faint.....	25
MEASUREMENT OF SURFACE ROUGHNESS — Part I by E. Green.....	27
A THICKNESS GAUGE FOR CERAMIC COATINGS by C. C. Gordon and J. C. Richmond.....	35
CLASSIFICATION AND DEFINITION OF DELAYED DEFECTS IN PORCELAIN ENAMELS by J. H. Keeler, P. K. Chu and H. M. Davis.....	37
SAFE TRANSIT — CARLOADING METHODS — Part III.....	73

FEATURES

THE SUGGESTION BOX.....	15
SNAPSHOTS AT ANNUAL MEETING OF AMERICAN CERAMIC SOCIETY.....	40 & 41

INDUSTRIAL NEWS

RECORD ATTENDANCE AT ANNUAL MEETING OF AMERICAN CERAMIC SOCIETY.....	37
INDUSTRY NEWS AND PERSONALS.....	47
CARRIERS ARE COOPERATING TO MAKE SAFE TRANSIT EFFECTIVE.....	66
AMA PACKAGING EXPOSITION DRAWS 19,100 PACKAGING MEN TO CHICAGO.....	69
COMPANIES COOPERATING IN SAFE TRANSIT PROGRAM.....	80

MISCELLANEOUS

FIVE KINDS OF STEEL USED IN MAKING REFRIGERATOR DISPLAY CASES.....	33
NEW SUPPLIES AND EQUIPMENT.....	44
ADVERTISERS' INDEX.....	78
CLASSIFIED ADVERTISING.....	78

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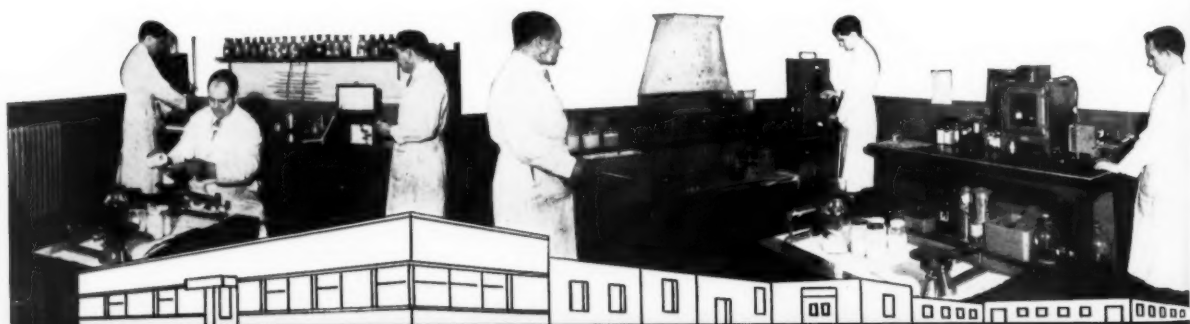
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VOL. 7 • NO. 7

	Page
SOLID-PHASE HOT PRESSURE WELDING by Gilbert C. Close	19
MEASUREMENT OF SURFACE ROUGHNESS—Part 11 by E. Green	22
PROMISE AND THREAT IN CURRENT AMERICAN BUSINESS by Edwin G. Nourse	25
A STUDY OF THE EFFECTS OF DECOLORIZING AGENTS ON A TITANIA OPACIFIED ENAMEL by Charles K. Russell	26

FEATURES

CAMERA SALON	17
THE SUGGESTION BOX	40
SNAPSHOTS AT THE 18TH ANNUAL MEETING OF ICHAM — finishfotos	38, 39, 70 & 71

INDUSTRIAL NEWS

GAS APPLIANCE MANUFACTURERS MEET IN WHITE SULPHUR SPRINGS	33
EIGHTEENTH ANNUAL MEETING OF COOKING AND HEATING APPLIANCE MANUFACTURERS	37
SUMMER HOMEFURNISHINGS MARKET	46
INDUSTRY NEWS AND PERSONALS	49
STEEL PRODUCT MANUFACTURERS VIEW PRODUCTION OF STEEL by Malden Grange Bishop	61

MISCELLANEOUS

ADVERTISERS' INDEX	82
CLASSIFIED ADVERTISING	82

finish

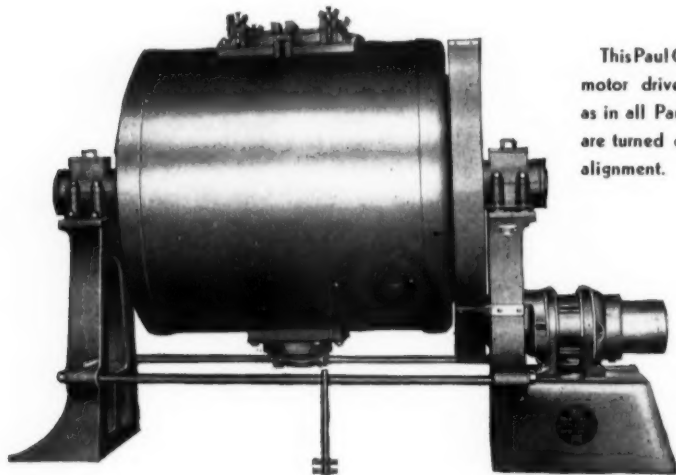
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VOL. 7 • NO. 8

MODERN FABRICATING AND FINISHING EQUIPMENT	Page
SPEEDS SPECIALIZED PRODUCTION by Lee Beckman	19
THE IMPORTANCE OF PRE-TESTING TO HOME	
APPLIANCE PRODUCTION by J. C. Sharp	27
NEW DEVELOPMENTS IN PORCELAIN ENAMELING	
by Burnham W. King	32
THE ROLL QUENCHING PROCESS by G. H. McIntyre	54
SAFE TRANSIT — FROM ASSEMBLY LINE TO FINAL	
CUSTOMER (a monthly feature)	59
TRANSPORTATION IS PART OF EVERY PRODUCTION	
LINE by Hobart H. Young	64

FEATURES

FROM THE EDITOR'S MAIL	6
PHOTO SALON	15

INDUSTRIAL NEWS

INDUSTRY NEWS AND PERSONALS	36
NATIONAL PROTECTIVE PACKAGING COMPETITION	44
PROGRAM FOR ANNUAL PEI FORUM	52
COMPANIES COOPERATING IN SAFE TRANSIT PROGRAM	68

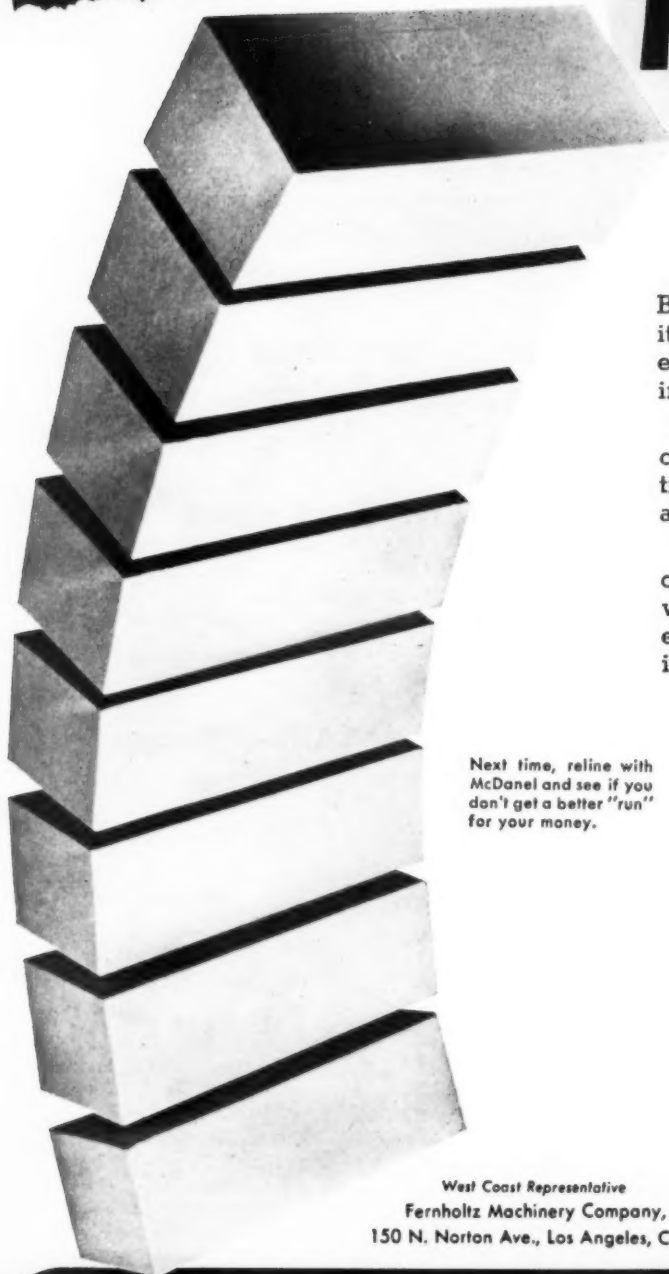
MISCELLANEOUS

ADVERTISERS' INDEX	70
CLASSIFIED ADVERTISING	70

FROM RAW METAL TO FINISHED PRODUCT

when it's time to reline...

McDaniel



Next time, reline with
McDaniel and see if you
don't get a better "run"
for your money.

West Coast Representative
Fernholtz Machinery Company,
150 N. Norton Ave., Los Angeles, Calif.

If you don't at present use McDaniel Brick in lining your mills, you may find it extremely profitable—as well as interesting—to try McDaniel Mill Lining Brick in your next relining job.

McDaniel Mill Lining Brick come in a complete range of sizes and, in conjunction with McDaniel Fill-In Brick, are easily and quickly set up.

Because they are *extra-fired* to ensure complete vitrification, McDaniel Brick wear longer than other brick. Their longer life means more production per relining—reduces costly downtime.

• **HAND ROLLED GRINDING BALLS**

Made from specially developed vitreous porcelain body and hand rolled for faster, uniform grinding. Mill tested and individually inspected before shipment to you.

• **MILL LINING BRICK**

Low in glass content, McDaniel Mill Lining Brick gives maximum resistance to wear and long, satisfactory service. Complete size range to fit every size mill.

• **MILL HEAD ASSEMBLIES**

Be sure to specify McDaniel Mill Head Assemblies on your new mills. No metal can contaminate your mill charge with these patented covers. They are taps for uniformity of batch and long service.

• **METAL COVERED GRINDING JARS AND MILLS**

Protected with heavy gage steel jacket McDaniel Metal Covered Grinding Jars and Mills are easy to handle, easy to clean, discharge rapidly and stand up under long usage.

McDANIEL REFRACTORY PORCELAIN CO.

BEAVER FALLS, PENNA.

CHICAGO VITREOUS ENAMEL PRODUCT COMPANY • EXCLUSIVE REPRESENTATIVES FOR THE ENAMELING INDUSTRY

September • 1950

VOL. 7 • NO. 9



LONDON GUARANTEE BUILDING
Michigan Avenue at Wacker Drive
THE HOME OF

finish

MONTHLY TRADE PUBLICATION
Established January, 1944

Published by

DANA CHASE PUBLICATIONS
360 North Michigan Avenue
Chicago 1

Telephone Central 6-1229

A trade publication devoted to the interests of the manufacturers of major home appliances and allied metal products. Covers plant facilities and manufacturing problems from raw metal to safe delivery of the finished product, with special emphasis on metal finishing.

Free controlled circulation to management, purchasing, engineering and key plant personnel in companies intimately connected with the field covered. To others, subscription price \$4.00 per year. All foreign circulation (U.S. funds) \$6.00 per year.

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MODIFIED BRAKE USED IN STRETCH FORMING

by Gilbert C. Close..... 17

PRE FORUM SECTION

HISTORY AND PROGRESS OF PEI FORUMS by Edward Mackasek..... 21

A MESSAGE TO THE INDUSTRY by F. L. Meacham..... 21

PROGRAM FOR 1950 PEI FORUM..... 24

PRODUCING "MAN-SIZED" STORAGE TANKS WITH GLASS-ON-STEEL INTERIORS

29

COMPREHENSIVE ABSTRACTS OF AES PAPERS

33

HOME LAUNDRY EQUIPMENT INDUSTRY—Special Section

REPORT OF AHLMA SUMMER MEETING..... 37

CINDERELLA HAS DONNED PRETTY CLOTHES by Helen W. Kendall..... 45

VIEWS OF EXECUTIVES IN HOME LAUNDRY FIELD..... 50

REPORTS ON PLANT EXPANSION IN HOME LAUNDRY FIELD..... 59

SAFE TRANSIT—FROM ASSEMBLY LINE TO

FINAL CUSTOMER (a monthly feature)..... 83

FEATURES

PHOTOGRAPHS FROM PRECEDING FORUMS..... 22 & 23

SNAPSHOTS AT AHLMA DINNER—finishfotos..... 46 & 47

THE WASHING MACHINE SHOW..... 52, 53, 58, 80

THE DRYER PARADE..... 55, 58

THE IRONER PARADE..... 57, 58

THE SUGGESTION BOX..... 64

INDUSTRIAL NEWS

INDUSTRY NEWS AND PERSONALS..... 61

PRESSED METAL INSTITUTE ANNUAL MEETING, SEPT. 11-17..... 68

COMPANIES COOPERATING IN SAFE TRANSIT PROGRAM..... 84

INDUSTRIAL PACKAGING, MATERIALS HANDLING SHOW, OCT. 10-12..... 85

MISCELLANEOUS

ADVERTISERS' INDEX..... 90

CLASSIFIED ADVERTISING..... 90

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FROM RAW METAL TO FINISHED PRODUCT

Lightweight Inconel burning
tool designed and fabricated
by STROHECKER, INC., Enon
Valley, Pennsylvania.

How much of your furnace load is **DEAD** load?

What percentage of your fuel bill is wasted
in heating excess tool weight?

And how much does it cost to maintain
this fixture load...in repairs, replacements,
wire-brushing?

The answer is, *plenty*...if your burning
tools are needlessly heavy, and needlessly
heat-vulnerable.

Here is how one large enameling concern
solved this problem...and how *you* can, too.

After studying the excellent performance
record of Inconel in high-heat applications,
they installed burning tools fabricated of
wrought Inconel®. They reported these re-
markable economies:

1. 35% to 50% saving in tool weight, per-
mitting increased furnace loading.
2. Substantial reduction in fuel costs.
3. Maintenance cut. Fixtures were in con-
tinuous service for 8 months before
cleaning was required.



4. No damaged finishes caused by spalling
of the tools.

In a competitive market, savings like these
show up big on the balance sheet!

Take the first step toward increased fur-
nace efficiency today...by writing to the
fabricator of these lightweight burning tools,
Strohecker Incorporated, Enon Valley,
Pennsylvania. Ask him to show you how
heat-resisting, anti-spalling Inconel fixtures
actually cost less on a price-to-service basis.

THE INTERNATIONAL NICKEL COMPANY, INC.
67 Wall Street, New York 5, N. Y.



INCONEL... for long life at high temperatures

October • 1950

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	Page
THE FABRICATION AND FINISHING OF COCA-COLA COOLERS by E. H. Wilkins.....	19
IMPROVED CASTING PRODUCTION PRACTICE by R. J. Wilcox.....	23
HOW TO INSULATE FINISHING PLANT EQUIPMENT by R. L. Davis.....	26
THE APPLICATION OF STANDARD TEST METHODS by F. A. Petersen.....	30
SAFE TRANSIT REDUCED OUR SHIPPING DAMAGE by H. W. Bonner.....	61
WHAT HAPPENS TO YOUR PRODUCT IN TRANSIT.....	62
AUSTRALIAN APPLIANCE PRODUCERS EXPANDING PRODUCTION by C. M. Andrews.....	72

FEATURES

FROM THE EDITOR'S MAIL.....	6
THE SUGGESTION BOX.....	11
PHOTO SALON.....	13
THE FINISH LINE — An Editorial.....	17
SAFE TRANSIT — FROM ASSEMBLY LINE TO FINAL CUSTOMER.....	55
SAFE TRANSIT LETTERS.....	57

INDUSTRIAL NEWS

NEW TYPE STREET SIGN SAVES TAXPAYERS MONEY.....	34
PEI SHOP FORUM FOR PLANT MEN HAS RECORD ATTENDANCE.....	35
INDUSTRY NEWS AND PERSONALS.....	39
GAS APPLIANCE INDUSTRY'S "LARGEST EXPOSITION," OCTOBER 2-6.....	46
NATIONAL METAL EXPOSITION AND CONGRESS, OCTOBER 23-27.....	48
COMPANIES COOPERATING IN SAFE TRANSIT PROGRAM.....	60

MISCELLANEOUS

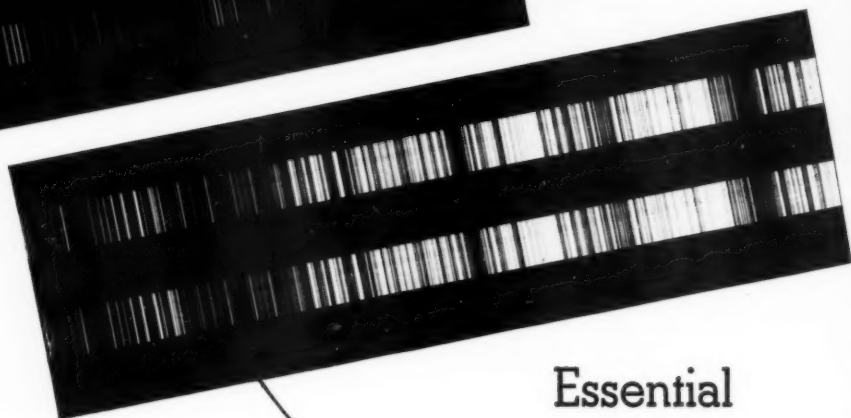
NEW SUPPLIES AND EQUIPMENT.....	52
ADVERTISERS' INDEX.....	70
CLASSIFIED ADVERTISING.....	70

FROM RAW METAL TO FINISHED PRODUCT

Only TITANOX-TG



**affords
the
purity**



Titanium dioxide can be the fundamental basis for frit formulation if you use TITANOX-TG. You can build your enamel around this pure and uniform ingredient because it provides the maximum yield of titanium dioxide without the impurities that adversely affect color uniformity.

These advantages prove why TITANOX-TG is your logical starting point for *controlled formulation* of modern titania frits. As always, our Technical Service Department stand ready to help you solve your individual problems.

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104 South Michigan Avenue, Chicago 3, Ill.;
2600 South Eastern Avenue, Los Angeles 22, Calif.
Branches in all other principal cities.

**Essential
to
controlled
formulation
of
TITANIA
frits**

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the brightest name in ceramics

TITANIUM PIGMENT CORPORATION
Subsidiary of NATIONAL LEAD COMPANY



November • 1950

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Michigan Avenue at Wacker Drive
THE HOME OF

finish

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Page

CONTROL OF HEAT AND AIR CONTAMINATION IN PORCELAIN ENAMELING PLANTS by H. D. Carter.....	19
LABORATORY CORROSION TESTING OF CHEMICAL-RESISTANT PAINTS by R. R. Rogers and W. Dingley.....	23
DRY DRAWING LUBRICANTS FOR DEEP DRAWING OPERATIONS by Richard F. Roy.....	27
POCKETBOOK ECONOMICS by W. W. Sebald.....	33
HOW AMERICAN STOVE SOLVED ITS DESIGN AND PACKAGING PROBLEMS by Russell F. Schoenbeck..	67

FEATURES

SNAPSHOTS OF MEMBERS OF PRESSED METAL INSTITUTE.....	30 & 31
PEI FORUM SNAPSHOTS — finishfotos	36
THE SUGGESTION BOX	52
SAFE TRANSIT — FROM ASSEMBLY LINE TO FINAL CUSTOMER.....	65

INDUSTRIAL NEWS

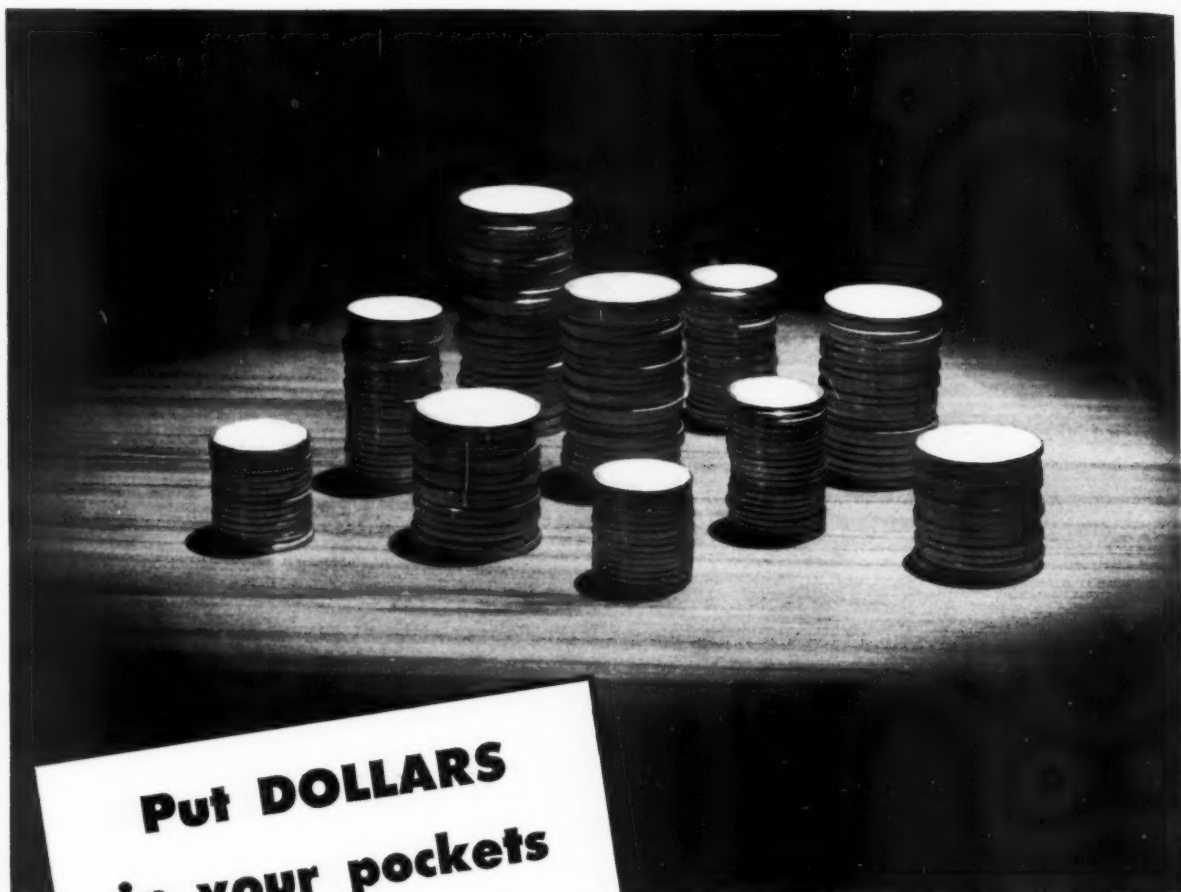
PRESSED METAL INSTITUTE ANNUAL MEETING	29
AMERICAN GAS ASSOCIATION HOLDS 32ND ANNUAL CONVENTION.....	39
INDUSTRY NEWS AND PERSONALS.....	47
PROGRAM FOR PAINT PRODUCTION CLUBS ANNUAL MEETING.....	53
MUNITIONS BOARD PACKAGING COMMITTEE MEETS.....	70
INDUSTRIAL PACKAGING AND MATERIALS HANDLING EXPOSITION.....	71
MIDWEST ENAMELERS TOUR HOTPOINT'S RANGE PLANT.....	74

MISCELLANEOUS

NEW SUPPLIES AND EQUIPMENT.....	62
NEW INDUSTRIAL LITERATURE.....	63
ADVERTISERS' INDEX	78
CLASSIFIED ADVERTISING	78

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FROM RAW METAL TO FINISHED PRODUCT



**Put DOLLARS
in your pockets
with CENTURY frits**

PLANTS that learned about Century time-proved frits during 1950 have more "dollars in their pockets" today as a result. Customers who have used Century enamels year after year can show a nice fat saving in enamel plant operating costs—that's why they continue to use them year after year.

Sure, they are priced right to start, but there are "in plant" savings that count up fast. Century ground coat enamels give the grip, the durability so important to your product, and they are easy and economical to apply. Century cover coats produce the finishes you can sell with confidence and produce them without extra fuss or special handling in the plant.

Make a note to arrange for a trial of Century frits before another month rolls by. Then, by the

end of 1951 you will agree with us that Century frits "put dollars in your pockets."

An experienced field service staff serves the plants of all Century customers.

Phone: PORTsmouth 7-7260

FRIT / **rom**
CENTURY
FRIT  **MASTERS**

CENTURY VITREOUS ENAMEL COMPANY, 6641-61 S. Narragansett Ave., Chicago 38, Ill.

December • 1950

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DANA CHASE PUBLICATIONS
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A NEW TECHNIQUE FOR INSPECTING METALS

by Gilbert C. Close..... 19

COBALT REDUCTION THEORY OF SHEET IRON ENAMELS

by J. H. Healy and A. I. Andrews..... 22

THE SYNTHETIC ENAMEL DEPARTMENT GOES MODERN

by Russell Wydeen 25

A MODEL MACHINE SHOP FOR RESEARCH LABORATORIES

SAFE TRANSIT SECTION..... 63

FEATURES

PHOTO SALON 11

THE FINISH LINE — An Editorial..... 17

SNAPSHOTS AT PEI ANNUAL MEETING..... 38

THE SUGGESTION BOX..... 48

INDUSTRIAL NEWS

PORCELAIN ENAMEL INSTITUTE HOLDS 19th ANNUAL MEETING..... 37

1950 NATIONAL METAL EXPOSITION..... 42 & 43

INDUSTRY NEWS AND PERSONALS..... 45

MISCELLANEOUS

REVIEW OF 1950 NEW SUPPLIES AND EQUIPMENT..... 58

ADVERTISERS' INDEX 77

FROM RAW METAL TO FINISHED PRODUCT

① Faster Processing

free-flowing, non-sticking,
non-balling -- reduced
pre-mixing and hammer milling
-- no sludging out in the
smelter.

② Maximum Efficiency

higher content of TiO_2 and
greater solubility mean
greater yield in frit.

③ Greater Opacity

makes possible thin, tough,
flexible, single-coat
porcelain enamels.

④ Certainty of Supply

made in a huge, new plant
wholly devoted to producing
this specially developed
non-pigmentary grade --
completely independent of
 TiO_2 pigment requirements.

5 Compelling Reasons TO BASE YOUR FRIT FORMULAS ON **TITANOX-TG**

⑤ Unvarying Chemical Purity

makes this titanium
dioxide a known quantity
in your frit...makes
color uniformity simple,
constant.

● Any one of the five above advantages alone is a compelling reason for basing your frits on TITANOX-TG. Combined, these outstanding advantages prove why TITANOX-TG is your logical starting point for modern frit formulation. Our Technical Service Department is always ready to help you. Titanium Pigment Corporation, 111 Broadway, New York 6, N. Y.; 104 South Michigan Avenue, Chicago 3, Ill.; 2600 South Eastern Avenue, Los Angeles 22, Calif. Branches in all other principal cities.

TITANOX

the brightest name in ceramics

**TITANIUM PIGMENT
CORPORATION**

Subsidiary of NATIONAL LEAD COMPANY



DECEMBER • 1950 finish

THE **finish** LINE



THE SECOND BIRTHDAY OF AN IDEA—

is celebrated by the publication, in this issue of *finish*, of a special section covering the National Safe Transit Program. This Program for the reduction of packaging and shipping losses throughout the major appliance and allied metal products field has now won nation-wide recognition and acclaim and is well past the early stages of "growing pains".

With what represents, we hope, a reasonable degree of modesty, *finish* will accept credit for three phases of this Program. First of all, the conception of the idea in the *finish* offices just two years ago—an idea for attacking one of the "bug bears" of modern product distribution through cooperative effort. Secondly, the development of an organization outline to include representatives from the cooperative associations of the manufacturers of major appliances and allied products, carrier associations, and associations representing the producers of packaging and shipping materials. The third point of service is represented in the fact that our publication has attempted to keep industry well informed of this cooperative and entirely voluntary program for saving millions of dollars in shipping losses and for building customer good will by using editorial space unsparingly during the intervening months.

The real credit

The real credit for the development of a practical and workable pre-testing program based on technical knowledge and practical experience plus the endless details involved in coordinating such a Program should go to others.

We must admit that it was with some degree of misgiving that we approached C. D. Clawson (then President of the Porcelain Enamel Institute) in early 1943 with the suggestion that the P. E. I. coordinate the Program—and R. F. Bisbee and top executives at Westinghouse Electric Corporation, Mansfield, Ohio, with the suggestion that Mr. Bisbee head such a Program as General Chairman. The present state of development of the National Safe Transit Program gives a ready answer to the willingness of these men and their respective organizations to cooperate wholeheartedly.

The job of coordination

It seemed entirely logical that the Porcelain Enamel Institute serve as coordinating agency for the Safe Transit Program due to the widespread interest of this group throughout the major appliance and metal products field. Nevertheless, it should be credited to the President, the Executive Committee and the membership as a whole that such a constructive movement for helping *all* producers should be so speedily taken "under wing".

During the intervening months thousands of communications have been promptly and meticulously handled through the P. E. I. national offices in Washington as has the coordination of the now wide-spread Committee activities and the publication of "News-Letters" to the

broad field covered. Our hats are off to the P.E.I. for so ably handling the job.

The power behind the pre-testing program

It is always difficult to give personal credit to a few, in a cooperative movement such as this, without appearing to "slight" many others, but we will take this chance in waving the flag for such men as Ralph Bisbee, of Westinghouse, Everett Shands, of Geo. D. Roper Corporation, and Fred Petersen, of the University of Illinois. Without the background of practical knowledge and persistent drive to get things done represented in General Chairman Bisbee, the N.S.T. Program could still be a dream of tomorrow. Without the technical knowledge and patient insistence of Everett Shands, the N.S.T. Pre-testing Plan could still be in the blue print stages. Without the thoroughness and educational training of Fred Petersen, Project I-A could still be a future plan trailing Project I.

Let's give credit to the progressiveness and generosity of the top executives in the organizations behind these men—without whose cooperation the numerous meetings, the heavy load of correspondence, and other committee activities could not have been successfully handled.

If you will turn to the Organization Chart in the National Safe Transit section and to the photographs of Committee personnel you will see the names and photos of many others who have worked hard and long, both on their own and on company time, in connection with the development and advancement of this cooperative program.

Everyone wins

As has been repeatedly pointed out on this page, the National Safe Transit Program is a strictly cooperative, voluntary movement. (There are no membership dues or fees involved.) All members of the Committee work without remuneration and the results of their work are offered to *all* appliance and allied metal products manufacturers on an equal basis. Here is a project where everyone wins through reduced handling and shipping losses, improved packaging and shipping procedures and, in many cases, lowered cost.

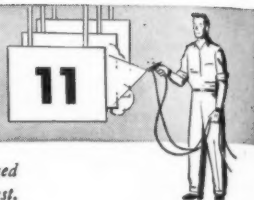
The best brains of the manufacturers' associations, the carriers' associations and the producers of packaging and shipping materials are back of this endeavor. We urge that the personnel of every manufacturer of a home appliance or allied metal product, from top executive to shipping foreman, read the complete Safe Transit section in this issue. All necessary information regarding participation is included. Then, if you have not already done so, send your application for membership at once to National Safe Transit Committee, 1010 Vermont Avenue, N. W., Washington 5, D.C. In this Program *everyone* wins.

Dana Chase

EDITOR AND PUBLISHER



Enameler's Data Sheet No. 11



An informative series on titanium-bearing killed steel for the enameling industry. Issued monthly by Inland Steel Company. Reprints of all data sheets are available upon request.

ANALYSIS OF COST FACTORS INVOLVED IN USING TITANIUM ENAMELING STEEL

Since the end of the war, sizable tonnages of titanium enameling steel have been used in production, and the results indicate that this superior base metal can effect economies in almost all porcelain enameling applications—despite the relatively high price of this metal.

Titanium steel, unlike ordinary enameling iron, requires no ground coat. It is non-reboiling and can be enameled with a single thin white cover coat. Frits have been developed which give satisfactory opacity, hardness, and reflectance with a coating of only 20 grams per square foot—a thickness of .004 inches—which fire out satisfactorily when applied directly to parts fabricated from the titanium enameling steel.

Because of the inherent advantages of titanium enameling steel, it is ordinarily used for parts for one of three different reasons.

1. For parts which are unsatisfactory from an *enameling* standpoint when fabricated from enameling iron or steel. Examples are white burner bowls for gas ranges and parts of heavy section requiring a good enamel finish on the edge. In these cases, cost is not the deciding factor.
2. For parts where extreme *flatness* after enameling is necessary. Good examples are exterior tops and fronts for commercial refrigerators. Here again, cost is not the deciding factor.
3. For parts where cost is of first consideration, examples being the usual stove and refrigerator parts. The comments on cost which follow, apply mainly to this class.



This burner bowl, made of TI-NAMEL and finished with white enamel, replaces the typical black enamel burner bowls.

Lighter Gage Sheets Can Be Used

Titanium enameling steel has such superior resistance to sagging and warping at enameling temperatures that lighter gage sheets may often be used. In general, a reduction of at least two gages can be made without affecting the flatness of the finished enameled part.

Less Enamel and Fewer Firings

Because the ground coat is eliminated and there are fewer reoperations with

titanium enameling steel, less enamel and fewer firings are required. This is not all gain, however, since on the back surface a ground coat is ordinarily used. Thus, with a single cover coat, a high cost cover enamel replaces a lower cost ground coat on the back.

How Much Work Can Be Single Coated?

The percentage of work that can be single coated depends upon the part, the inspection standard, and the care taken in processing. It ranges at present from 35 to 50% for stove tops to 92% for stove end panels.

Chipping Reduced

Enamel chippage has been reduced to a remarkably low figure in all cases where cover coat enamels are applied directly to the titanium steel. In one case, more than one quarter million parts have been enameled in this manner with negligible chippage losses.

Crating Costs Reduced

Indications are that crating costs can be reduced because of the greater resistance to damage of the thinner enamel coating.

Less Shipping Weight

The use of lighter gages of steel and the thinner enamel coatings reduce the over-all weight of the finished product.

Inland Steel Company, 38 S. Dearborn St., Chicago 3, Ill.

SALES OFFICES: Chicago, Davenport, Detroit, Indianapolis, Kansas City, Milwaukee, New York, St. Louis, St. Paul

OTHER PRODUCTS: Bars • Sheets • Strip • Structural Plates • Tin Plate • Floor Plate • Piling • Reinforcing Bars
Rails • Track Accessories • Pig Iron



INLAND TI-NAMEL

Reg. U. S. Pat. Off.

TITANIUM-BEARING KILLED STEEL ENAMELING SHEETS

Seventeenth annual meeting of cooking and heating appliance manufacturers

stove men discuss a "decade of opportunity" and the "era of the salesman"

AN optimistic outlook for business in 1950 prevailed at The Institute of Cooking and Heating Appliance Manufacturers 17th annual convention and exhibit held at the Netherland Plaza Hotel, in Cincinnati, December 5, 6 and 7. The stove men attending the convention apparently were no longer apprehensive about the buyers' market, though many realized they still have a job to do in training their sales staffs.

The manufacturers were told that the next ten years would be a "decade of opportunity" and that the second half of this century would be the "era of the salesman."

At the general session on Tuesday morning, A. B. Ritzenthaler, vice president of The Tappan Stove Co., and reelected Institute president, noted that a "general tone of optimism exists at this meeting—compared to the past few meetings."

Decade of opportunity ahead

Mr. Ritzenthaler listed a number of pertinent facts which should make the 1950's a "decade of opportunity." He stated that ten years from now one-third of the families in this country will be new families . . . popu-

lation will rise to 160,000,000 . . . income will go up 10% . . . more than 1,000,000 new dwelling units



A. B. RITZENTHALER finishfoto

will be built each year for the next ten years . . . the appliance industry should have a potential growth of 25% during the coming decade.

"The consumer will decide your progress and determine your future," he emphasized, adding that each manufacturer's "product must be good, his price must be competitive, and he must serve honestly" in order to

gain the confidence of the consumer.

America's opportunity system

In his talk "Hook, Lyin' and Sink-er," Warren Whitney, vice president of National Cast Iron Pipe Division, James B. Clow & Sons, had a lot to say about the American "opportunity system" which he fervently believes is the only thing we can offer the world.

The speaker expressed the fear of "a gullible people buying a change for the sake of change alone" without regard to the overall consequences. The present trend to "security without work, controlled shortages, and non-contributory plans" lead down the road to Socialism which is not faring at all well in Britain, the speaker pointed out.

In these troubled times we "need to walk like a man." "Opportunity of the individual is the only thing we can offer the world," concluded Whitney.

The pension dilemma

Ben Mugridge, partner of Dodge & Mugridge, consultants in labor relations, discussed at great length the current problem of "The Pension Dilemma." →

Management forum panel consisted of, left to right: J. B. Tudhope, Florence Stove; Hugo Kenitz, Globe American; Cecil Dunn, Estate; Sidney Hill, Cribben & Sexton; H. L. Clary, Norge, and A. B. Ritzenthaler, Tappan Stove.

finishfoto





A. D. Olds and C. W. Coleman, of The Coleman Company, Inc.; and Richard Abrell and G. R. Calkins, of Redmond Company, Inc.

"Demand for more and more protection against the hazards of old age and of disability will grow in the period ahead," predicted Mugridge. "Workers throughout industry and in non-industrial occupations are vitally concerned about their retirement security. Fear of insecurity is not a new thing. It is a product of the industrialization of the country and mass employment. . . .

"The phenomenal advancement in our living standards does pose a question. If people constantly obtain more—more wages, more purchasing power—why don't they put enough aside to insure them a decent retirement and protection against disability and sickness?

"But the predisposition of most people is to spend, not save, believ-

ing that the future will somehow take care of itself. So it happens that when a man reaches 65 he just doesn't have the money. The saving operation is made more difficult in a country undergoing a constant rise in living standards which tends to absorb increases in real wages. . . .

"Today there are more than 9,000 employer-initiated plans in the country . . . They are expensive and can be adopted by only prosperous concerns. . . .

"There are other plans which have been negotiated by unions and companies, many more of which are in the offing. . . . But they will be just as inadequate as those set up voluntarily by industry. For they cannot give coverage to all workers nor can they be negotiated in those plants

where the employers cannot afford them. And there is always the likelihood that a negotiated plan may have to be bargained out of a contract when a business is suffering reverses. . . .

"Another means now used for providing retirement aid is old-age assistance from the Federal government. At present over 2,500,000 people are receiving this Federal old-age assistance. The payments are about twice as large as all the payments under Federal Social Security . . . which does not have the major weaknesses of the other plans. Social Security encompasses all jobs in the covered industries . . . and pensions are paid as a matter of right and not as a gratuity or a political favor.

"But at present the Federal plan is inadequate, its benefits are too low, its coverage too limited. This inadequacy could be readily rectified if we were ready to recognize that a problem exists which must be solved judiciously and wisely. One great impediment is fear of the welfare state. But regardless of their implications certain social demands and needs of the country cannot go unheeded. . . . Between industrial pensions and Federal social security with its welfare state taint, it may be necessary to select the 'least worst.'

"You are undoubtedly perplexed about your own problems and how you may meet them," he said in speaking to the stove industry. "Yours is an old industry composed of many relatively small companies. The average age of your employees is probably high. Whenever such conditions exist pension costs are usually prohibitive. . . . A pension plan is a long term proposition; it cannot be considered otherwise. . . .

Contributory vs. non-contributory pension programs

"Here are generally the arguments for non-contributory plans: the average employee cannot afford to contribute; cost of pension is the same type of expense as cost of depreciation of equipment; the employer gains increased efficiency justifying pension costs; the wider coverage of and participation in non-contributory

JANUARY • 1950 *finish*



R. A. Jacobs, of Jacobs Manufacturing Company; King Ehret, of Oakland Foundry Company; and Henry Ostborg, of Sears, Roebuck & Company.

finishphotos

E. J. Bohnen, of International Register Company; and A. E. Koch, E. K. Hampel and K. C. Hampel, all of Odin Stove Manufacturing Company.



plans avoids certain administrative inconveniences and expenses; employers can charge contributions to pension plans to taxes, employees cannot.

"And those in favor of contributory plans advance these reasons: employee contributions assure larger pensions, particularly when the employer must limit his obligations; by contributing, workers realize that pensions must be paid by someone and this may temper future pension

ICHAM Officers For 1950

President: A. B. Ritzenthaler, vice president, The Tappan Stove Company, Mansfield, Ohio.

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Vice President, Memberships: Cecil M. Dunn, vice president and general manager, Estate Heatrola Division, Noma Electric Corp., Hamilton, Ohio.

demands; employees have a stronger claim to pensions by right; the industrial-relations value of a contributory plan is greater; under a contributory plan the employer must make adequate funding arrangements. Inasmuch as workers have been accustomed to contribute under the Social Security Act it seems fitting that they should do the same under a private plan.

"And that brings us to the discussion of whether a pension plan should be integrated with the present Social Security benefits. And the answer is emphatically yes. For the present philosophy is that industry should only supplement Federal aid until such time as the latter is adequate. . . .

"It is possible that the Steel

finish JANUARY • 1950



T. A. Glascock, Jr., of Glascock Stove & Mfg.; M. L. Carl, of Sloss-Sheffield Steel & Iron; S. J. Price, of Birmingham Stove & Range; and K. H. Brown, Brown Stove.

Board's recommendation and the union pension drive have brought focus on the necessity of coordinating and centralizing the whole scheme of social security in such a manner as to point out that it is not the concern of industry or any other group, but the country as a whole. For only in this way can it be removed from the arena of collective bargaining; and only then can its true cost be determined and its impact be regulated in the interest of the nation and its economy.

"We shall have reached a milestone in labor relations if unions and industry will soon recognize that here is a social problem affording unification of opinion. For such an opinion would be helpful in impressing upon the Congress the urgent need

for handling social security without political prejudice and political skulduggery. If this unification fails to materialize we will undoubtedly be faced with the most precarious era of labor relations yet experienced and an employee morale which may seriously retard our production," concluded Mugridge.

"Selling is human"

The final address before the general session, entitled "Selling Is Human," was given by Fred Kaiser, vice president of Detroit-Michigan Stove Company, and ICHAM executive vice president for the past year.

"If an economic history of our country should be written," said Kaiser to Page 69 →

More photos . . . Pages 66 & 67



Bruce Young, Jr., of Stainless Metal Products Company; and C. G. Farabee and B. P. Finkbone, of Armco Steel Corporation.

finishfotos

Norman Norlie, of Wilbur B. Driver Co.; D. V. Tuttle and B. W. Hines, of Ferro Enamel Supply Co.; and K. B. Smith, of Norge Division, Borg-Warner Corp.





Shown is the oval shaped first draw on the "well" of a roaster.

Deep drawing of rectangular and round shells

a practical discussion of some of the basic considerations relating to dies, presses, and operating practice

by William P. Von Behren • EXECUTIVE VICE PRESIDENT, THE SWARTZBAUGH MANUFACTURING COMPANY, TOLEDO, OHIO

THIS discussion is intended to cover the deep drawing of light-gage metals, with particular emphasis on steel and stainless steel.

In rectangular draw work, everything is relative. It is almost as big a job, with the exception of the cast iron involved, to draw a shell approximately 1" wide by 2½" long and 1" deep with sharp corner radius of say .008 metal, as it is to draw a casket or a bathtub. If one compares these mathematically, I believe he will find they are more or less proportionate.

A definition of "deep drawn"

Many persons consider a shell 4" deep as being deep drawn. This may be true if the diameter is small, but if the object is the size of a dishpan, or larger, it really can't be considered deep drawn. So, just for the sake of argument, let's consider anything requiring two or more reductions as being deep drawn.

There are certain basic details in the design of the final shell that will make the job of deep drawing easier. The more generous the radii of the corner shell, the easier the draw job will be. This will approach the ultimate in a round shell. It helps the lapping better.

Importance of bottom radii

The radii at the bottom of the shell is quite important. It has to be within certain limits. If it gets too large it will approach a hemisphere which, while not impossible to make, will aggravate the tendency to wrinkle or pucker. The radii used and the temper make a big difference, too. In general, the greater the tensile

strength and ductility, the greater the reduction that can be taken.

Comparing the drawing qualities of metals

Aluminum and vitreous enameling steel are more difficult to draw than low carbon steel, and even with mild steel you can't take the reductions that you can with drawing quality stainless steel. If you have a rugged set of dies that will draw aluminum, and make minor corrections for clearances, radii, and materials, they will work well with mild steel and stainless steel.

It must be remembered that the quality of the metal must be right for deep drawing. As a rule, the metal companies tailor-make the sheets for deep draw jobs.

There is no positive test for drawability of metal. Some people swear by the Olsen cup test; others put a sample of the metal in a vise and bend it back and forth and count the flexes until it breaks. Both tests are relative and must be compared to sheets of proven drawability.

We have found that there is no substitute for actual operation in presses and always try to do this when possible. Just because a sheet is soft and bends easily is no proof that it is a good drawing sheet. A soft fully annealed sheet, which does not have the tensile strength it should, is subject to stretcher straining and breaking. A slight amount of cold work by rolling or roller leveling will help a lot.

Choosing the press for the job

Heavy gage metals can be drawn in single-action presses without a blank holder, but for light gage deep

draw work the double-action mechanical toggle press or the double-action hydraulic is mandatory. You can do simple draw jobs up to approximately 6" deep with single-action press equipment equipped with an air cushion, rubber, or spring-type blank holder. But in most cases, it is necessary to use double-action presses.

With these, the blank holder pressure can be individually adjusted on each of the four corners. This permits jobs not possible otherwise. Draw presses for aluminum can be run faster than for steel, and those for steel can be run faster than for stainless steel. Double-action presses run slowly compared to single-action presses, and the smart stamper will always try to get by with a single-action air cushion job, if possible.

The hydraulic press, which has a different type action than the mechanical, may either do the "impossible" in a draw job, or reduce the breakage in a tough one. But again, these are not too popular in the average stamping shop because of their initial cost, high maintenance, and low output.

Keep the draw job moving

There will be considerably less breakage on a multiple draw job if the metal can be kept moving. By this is meant that one draw should follow the other as rapidly as possible. The parts should not cool off. To do this, there must be as many presses as operations. Continuous operation like this not only reduces breakers, and improves the quality of the work, but it greatly reduces floor space requirements and handling

problems. It's a very tough assignment to produce a multiple draw job in quantities with too few presses.

The subject of handling is important in this type work. If you don't take the shells away from a press, it will bury itself in a short time. We make large quantities of electric roasters and it is interesting to note that on the inset pan the volume necessary to store a shell is 500 times as great as the flat blank. We have not had good success with chain conveyors for handling our shapes. They are hard to get close enough to the presses to be convenient. We have standardized on either roller conveyors or crate trucks 4 feet wide, 6 feet long, and 3 feet deep. These are very flexible and about as satisfactory as anything that has come to our attention.

Steps in making dies for deep drawn work

We have found that too few die designers and die makers are experts in this deep drawn work. Over a period of years we have paid the price of experience, and feel that we

have a good idea how these dies should be built. Our first move is to consult with our die designer. Our first objective is to get the approximate blank development, graphically and mathematically, tempered by a few hunches, of course.

From this we determine the necessary reductions, mathematically. We have found that it pays to be conservative and include enough operations. If you don't, or the reductions aren't in proportion, you are in for continual trouble, high breakage, and poor quality work.

After the diameter and height of the intermediate shells are calculated, the designers go to work. We have them specify all punch and die sizes, clearances, radii, tapers, etc.

Most of our dies are made by outside shops. Our men make the try-outs and do the final fitting in the press in which the job is to be run. This has eliminated a duplication of expense and has saved us considerable over a period of years.

For most rectangular or square shells requiring three or more draws, we start out with a round shell on

the first operation, but some two-draw jobs will require an oval first draw to make the final rectangular shell. We have found that a bowed side wall, such as presented by an oval shell, will flow into a straight side wall much better than a straight one will.

The original shell should be of such a shape that it is almost tangent to the increasingly sharp corner of the ensuing draw. Because of physical strength limitations on the blank holder, this "tangency" misses by about $\frac{3}{8}$ " on large dies, and slightly less on small ones. On all re-draw dies, we like to use either complete or partial nests between 1" and 4" deep.

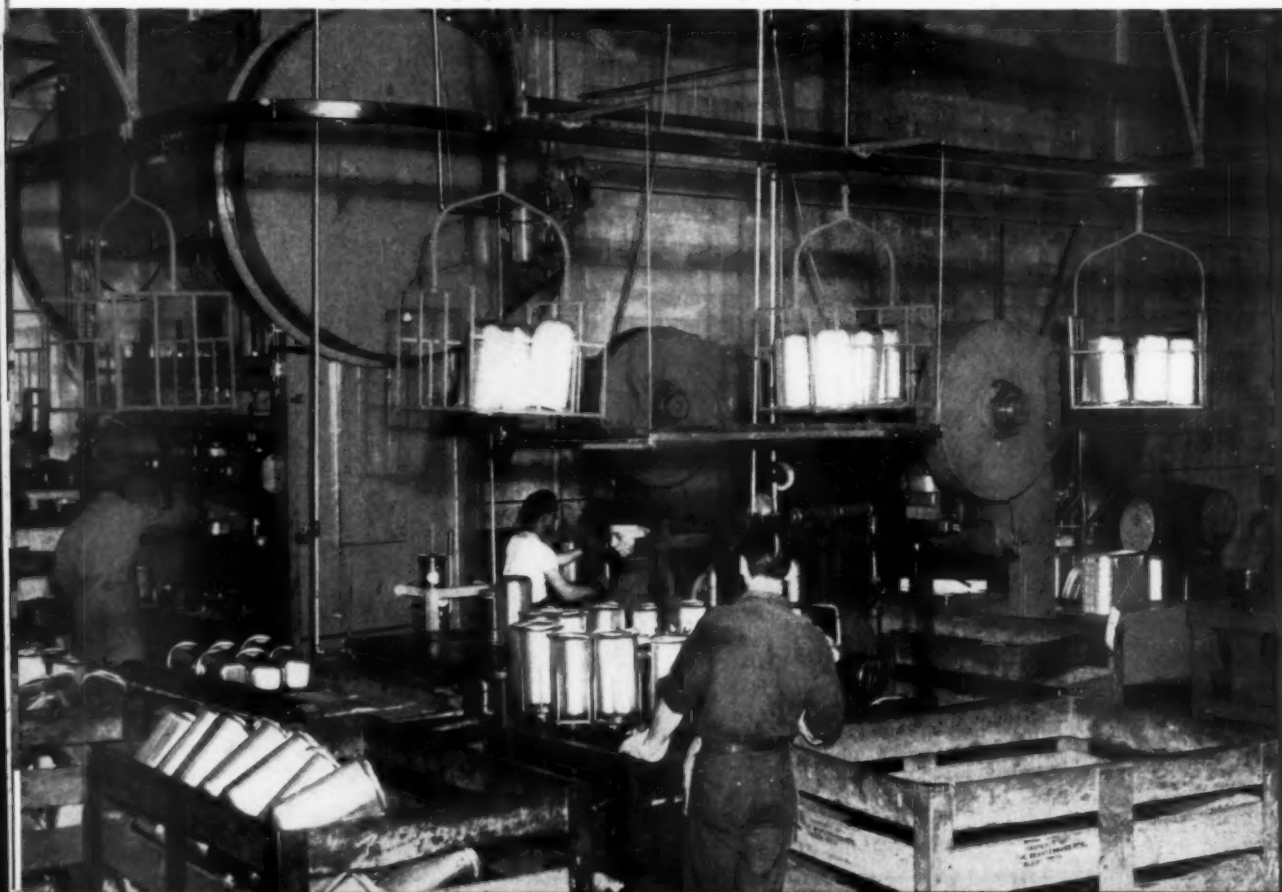
These are quite necessary on the ends of ovals or the corners of rectangular shapes. They prevent the metal from "walking" away from the punch, and piling up ahead of the draw ring and eventually fracturing.

Limitation to number of reductions

There is a limitation to the number of reductions that can be made. This

to Page 70 →

Shown are a group of finishing operations in the author's factory on parts known as the "inset" or "utensil".



The hot spray process for organic finishes

a complete outline of equipment requirements, effect on materials and spraying technique, and the results that may be expected.

by *James A. Bede* • PRESIDENT, BEDE PRODUCTS, INC., CLEVELAND, OHIO

ONE of the most important advancements in the finishing field in recent years has been the successful development of the hot spraying process. The process is designed to use heat as a viscosity reducing agent, in effect substituting heat for thinners. It is predicated on a basic law of nature and will make possible, for the first time, constant spraying at a uniformly ideal temperature.

In those places where the process has been properly put into practice, the results produced clearly establish the potential benefits. Labor and material savings can be achieved, and at the same time the appearance quality of the finish conspicuously improved.

It is true that a few years before the war hot lacquers were talked about by many, tried by a few, and generally discarded. Most of these tests were prematurely conducted, with insufficient technical developments to back them up.

Process successfully applied in European countries

In certain countries of Europe hot spraying has been very successfully developed. In Sweden, for example, 90% of all lacquers are now sprayed hot. Although the theoretical value of the process has long been recognized in this country, its general acceptance and adoption has been delayed because there was no practical, trouble-free and economically-priced device to accomplish heating.

Finish formulas available

Unfortunately, the paint manufac-

turers also found that it was not always a simple matter to adjust every formula for hot spray. These obstacles have now been overcome. Coincidental with recent improvements in paint heaters, very important progress has been made by paint manufacturers in perfecting hot spray formulations. The chain is now complete so that any paint user who wishes to avail himself of this new process can undertake to do so with reasonable assurance of success, if he will follow the correct procedure. It shall be the effort of this article to point out the factors involved and the steps necessary to obtain success.

Why thermal control is desirable

In most cases with the hot spray process, paints are heated to a fairly high temperature (between 160° and 200° F.) just before spraying. In this manner heat is substituted for thinners. It is a well-known fact that temperature plays an important part in the application characteristics of any organic finish. We have all heard the expression "slow as molasses in January." Paints can be said to be in the same family, chemically speaking, as molasses, and have as poor performance in cold weather.

Every finisher has experienced the difference in spraying during winter months (at 60°) and during summer (at 90°). If 30° makes so much difference, how much greater benefit would be obtained if we increased the paint temperature still another 100°? Thus we see that the maximum objective in hot spraying is not simply to level off daily and seasonal temperature fluctuations, but to obtain

thermal control at a much higher temperature than prevails on the hottest summer day, thereby obtaining the maximum benefits from heat. The skilled finisher has attempted in his own way to compensate for the daily and seasonal temperature fluctuations as he encountered them. Not always was he successful, and at best the results were a compromise. Now, however, the variations caused by fluctuating temperatures can be completely eliminated, and the optimum paint temperature uniformly maintained irrespective of weather conditions.

The effect of hot spray on organic finishes

By heating paint to 160° F., the viscosity is generally reduced to 1/3 or 1/4 of the viscosity at 70° F. There is of course a natural limit to this thermal action. When the viscosity reaches approximately 12 to 13 seconds, very little further drop is encountered. The saturation point of the thermoplastic action is generally reached at approximately 160° F. for synthetics but a little higher than that for lacquers. An accompanying chart shows typical temperature-viscosity curves for both lacquers and synthetics.

Another important key factor to consider is the much greater loss of solvent in the process of atomization. A typical example of what takes place in hot spray in contrast to cold spray is indicated in the accompanying comparison chart. The figures given are meant only as a typical illustration, to show what action takes place, and do not necessarily apply to all

types of finishes. The relationship of solid content, viscosity, solvent loss in atomization, etc., will vary with the different finishes, but the ratio of variation and performance between cold and hot spray is virtually the same for all types of organic finishes.

Solvent loss and "paint chilling"

In the process of atomization, a certain amount of solvent is released from the finish. This amount varies depending upon temperature, evaporation rate of the solvent, the distance the gun is held from the surface, etc. But it generally averages between 16 and 22% for room temperature spraying. Therefore, the coat of finish deposited on the surface has a greater proportion of solids, and a lower solvent content than the original material.

In hot spraying, the solvent loss is much greater (up to 80%) because the paint comes out of the gun at almost the boiling point of the solvent. This solvent loss is very desirable, providing the remaining solvent carries the burden of proper

flow. This is probably the most critical factor in hot spraying and the one point which may make a hot spray test fail. However, it is this very fact that brings about so many of the benefits of hot spraying.

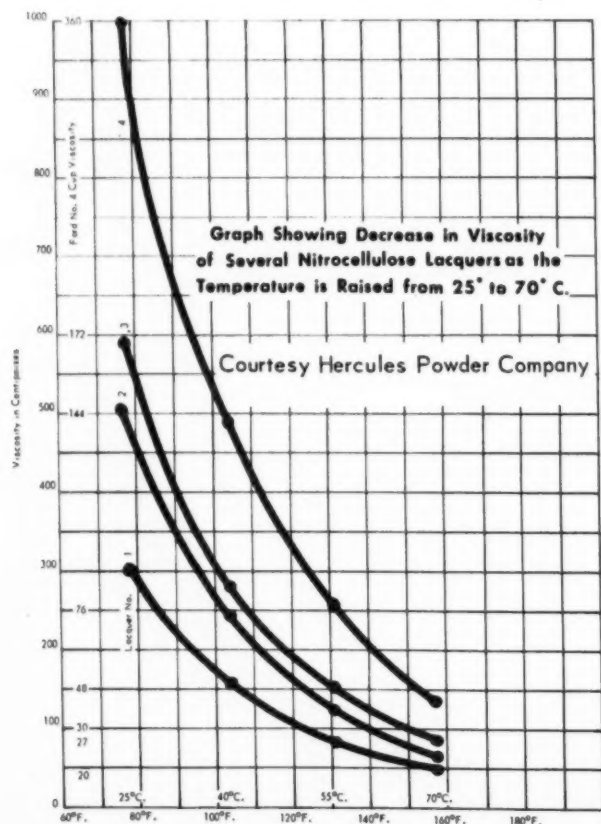
Evaporation of the solvents, plus expansion of the compressed air, causes a refrigerating action. Because of the high temperatures involved, the atomized particles in hot spray drop much more in temperature than the same particles in cold spray, but still reach the product surface at a higher temperature and with better flow characteristics than in cold spray. Some finishers mistakenly anticipate that the paint will strike the surface in a very warm state, and are disappointed in the hot spray process when they find out that this is not so. It is important to bear in mind that the atomization takes place within 1" of the tip of the spray gun where the opposing air streams from the cap converge. The rest of the fan action simply spreads the atomized particles to the desired pattern for easy spreading of the paint on the surface. The

subsequent paint chilling can be ignored.

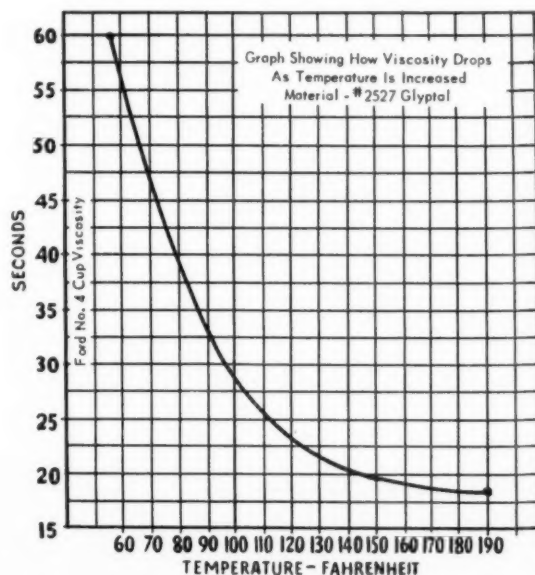
Temperature plays an important part in the spraying properties of every finish, and there is some one ideal temperature at which it is best sprayed. At this ideal temperature, atomization is most easily accomplished and the paint particles flow out most smoothly.

In many cases the hot spray process is used to gain one or two specific benefits. In nearly every factory the management is seeking certain improvements in the paint department in preference to any others—for example: to reduce paint loss, to reduce rejects, or perhaps to obtain better coverage.

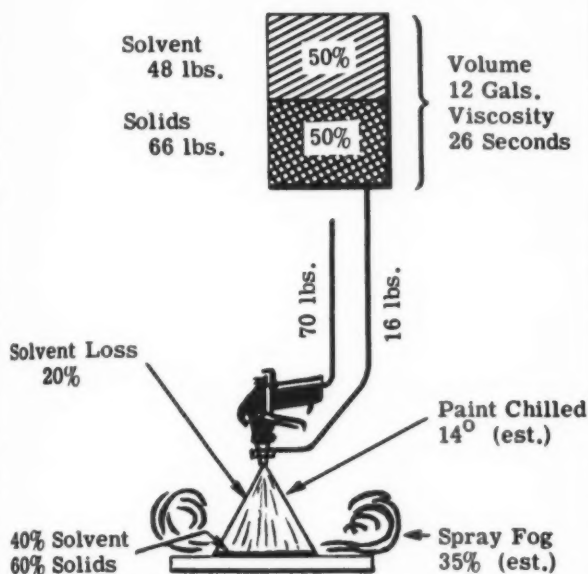
In spraying at room temperature, a sprayer has very little latitude in his finishing adjustments. His balance in solvent content, spraying pressures, and gun stroking are restricted within very narrow limits. He has very little latitude as to how much paint can be put on the surface without sagging. But with hot spray these latitudes are appreciably increased.



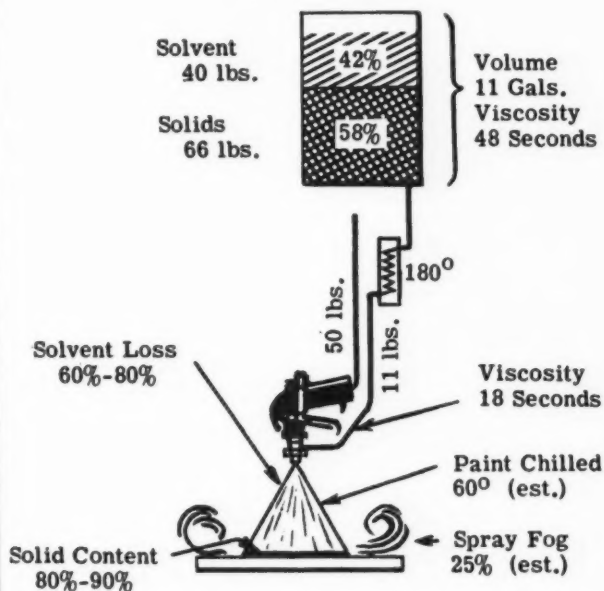
Shown are typical temperature-viscosity curves for both lacquers and synthetics.



Cold Spray



Hot Spray



1. Total trigger time required to spray all the material (material flow at 12 GPH):

60 minutes

2. Total volume of air used in atomization:

(70 lbs. at 20.2 CFM times 60 minutes)
6,981 cubic feet of free air

3. Film thickness required to cause sag in a vertical position:

1.2 mils

Explanation:

To ten gallons of typical synthetic enamel, two gallons of solvent are added (20% reduction), raising the total solvent content to 50% by volume and lowering the viscosity to 26 seconds. Fluid pressure of 16 pounds gives the correct rate of material flow (12 gallons per hour) for efficient gun stroking. The paint as it leaves the gun requires 70 pounds of air for good atomization.

54 minutes

(50 lbs. at 15.5 CFM times 54 minutes)
3,682 cubic feet of free air

2.6 mils

Explanation:

Instead of two gallons, only one gallon of solvent is added to ten gallons of synthetic, making the solvent content 42% by volume, and lowering the viscosity to 48 seconds. Heating to 180° reduces the viscosity to 18 seconds. A fluid pressure of 11 pounds gives a rate of flow of 12 gallons per hour. The paint requires only 50 pounds of air for atomization.

Possibilities for saving materials

Basically, paint savings can be accomplished because the heated paint requires much less air for atomization, and hence proportionally less paint particles are blown past the surface being sprayed. Too few seem to realize the great volume of paint lost in spraying. Often 50% of the paint is lost in overspray and even under the most ideal conditions it is estimated that at least 25% is lost. Because we have reconciled ourselves to this loss, the tendency is to ignore it. Theoretically it would be "Utopia" if we could accomplish spraying without any air at all, and with hot spraying we partially accomplish this goal.

A very important point to consider in attempting to accomplish paint savings is to avoid putting on the surface a film thickness greater than normally is required. If this is done, the reduction in overspray is more than offset by the greater amount of material deposited on the surface. It is possible to maintain any film thickness desired (the range is much greater than for cold spray). The film thickness is controlled by correctly adjusting the viscosity.

It is important, therefore, to bear in mind that the amount of solvent used in hot spraying must be carefully watched. There are three groups of operations:

(1) Where the object is to maintain a minimum film thickness, just enough to obtain complete coverage of surface.

(2) Where the objective is to spray a moderately heavy film for pleasing eye effect.

(3) Where multiple coats are applied with the objective of obtaining the thickest film possible for special applications.

For the first class of operations, where paint saving is the primary objective, the amount of thinner used for hot spray should be the same or very close to that which is used for cold spray. As this relatively thin

to Page 73 →

Adherence of sheet steel ground coats as influenced by titania mill additions

by Leonard Will • CERAMIC ENGINEERING DEPARTMENT, OHIO STATE UNIVERSITY, AND

R. M. King • ASSOCIATE EDITOR, PROFESSOR OF CERAMIC ENGINEERING, OHIO STATE UNIVERSITY, COLUMBUS, OHIO



Titanium additions to steel have been reported to be effective in eliminating or reducing the need for cobalt oxide in porcelain enamel ground coats. Also some success has been achieved in applying cover coats, opacified with titanium oxide, to the base steel. The latter procedure requires that the steel be of the highest quality, that the iron or steel base be carefully prepared, and also requires rigid control in the

enameling plant, and careful selection of the type and shape of the ware.

There is little doubt that progress has been made toward eliminating cobalt oxide ground coats through the use of titanium in steel and titanium oxide in enamels, but so far as the authors can determine the elimination of conventional ground coats has not been general. Nevertheless, a special role for titanium is indicated and inspired a search for an explanation.

It has been stated in the literature that when titanium oxide is added

to a glass the titanium ion takes the place of the silicon ion in the glass network and assumes some of its functions. Only a small amount can do this, however, and any titanium oxide in excess of this amount fails to dissolve, and opacifies the glass.

It is further stated that this dissolved titanium oxide influences certain structural groupings and hence tends to enhance certain colors which may be present. For example, it "brings out" the iron color in a glass, and this role of titanium may be partially responsible for the amber colors which trouble the makers and users of titanium-bearing enamels. This same property of the titanium ion would tend to increase the blue color of a glass containing cobalt oxide without increasing the amount of cobalt oxide. Since it is claimed that the blue rather than the pink cobalt ion, both of which are present, is responsible for the adhering qualities of the cobalt oxide ground coat, the use of titanium oxide to improve the adherence of such ground coats is suggested. Following is a report of a research designed to determine whether or not this is true.

Table I

Adherence Evaluation of Cobalt Oxide-Titanium Oxide Ground Coats

	2% TiO ₂	4% TiO ₂	6% TiO ₂	8% TiO ₂	10% TiO ₂
1.0% Co ₃ O ₄	Adh-D C-Deep Blue	Adh-C C-Deep Green-Blue	Adh-B C-Brown Green	Adh-A C-Brown	Adh-A C-Dark Brown
0.8% Co ₃ O ₄	Adh-C C-Green Blue	Adh-C C-Deep Green	Adh-B C-Green Brown	Adh-A C-Brown Green	Adh-A C-Dark Brown
0.6% Co ₃ O ₄	Adh-C C-Blue Green	Adh-C C-Green Brown	Adh-C C-Green Brown	Adh-C C-Brown Green	Adh-B C-Dark Bro-Green
0.4% Co ₃ O ₄	Adh-D C-Dark Yellow Blue	Adh-D C-Dark Green	Adh-D C-Dark Green	Adh-D C-Yellow Green	Adh-D C-Brown Green
0.2% Co ₃ O ₄	Adh-E C-Green Blue	Adh-E C-Light Green Blue	Adh-E C-Yellow Green	Adh-E C-Yellow Brown	Adh-E C-Dark Yellow Brown
0.0% Co ₃ O ₄	Adh-E C-Matt Green	Adh-E C-Yellow Green	Adh-E C-Yellow Brown	Adh-E C-Brownish Gold	Adh-E C-Reddish Brown

Key to Tables

Adh-Adherence

A-Excellent

B-Good

C-Fair

D-Slight

E-Poor

C-Color

Table II

Adherence Evaluation of Nickel Oxide-Titanium Oxide Ground Coats

	2% TiO ₂	4% TiO ₂	6% TiO ₂	8% TiO ₂	10% TiO ₂
1.0% NiO	Adh-D C-Dark Black	Adh-B C-Dark Black	Adh-B C-Dark Black	Adh-D C-Dark Black	Adh-D C-Brown Black
0.8% NiO	Adh-C C-Gray Black	Adh-C C-Dark Black	Adh-E C-Dark Black	Adh-E C-Dark Black	Adh-E C-Brown Black
0.6% NiO	Adh-E C-Gray Black	Adh-E C-Dark Black	Adh-E C-Dark Black	Adh-E C-Dark Black	Adh-E C-Dark Black
0.4% NiO	Adh-E C-Gray Black	Adh-E C-Gray Black	Adh-E C-Dark Black	Adh-E C-Dark Black	Adh-E C-Brown Black
0.2% NiO	Adh-E C-Gray Black	Adh-E C-Gray Black	Adh-E C-Gray Black	Adh-E C-Gray Black	Adh-E C-Brown Black

Plan of investigation

The base composition of the ground coat employed was that of Bureau of Standards No. 11, which is as follows:

Batch Composition

Feldspar	31.0
Flint	18.0
Borax	37.1
Soda ash	5.9
Soda nitre	3.8
Fluorspar	3.0
Cobalt oxide	0.5
Nickel oxide	0.6
Manganese oxide	1.1

Chemical Composition

SiO ₂	49.2
Al ₂ O ₃	7.7
B ₂ O ₃	17.4
CaO	2.9
K ₂ O	4.5
Na ₂ O	15.2
F ₂	0.04
CoO	0.60
NiO	0.70
MnO ₂	1.40

A batch containing 1% cobalt oxide and a batch containing 1%

nickel were melted. The frits were fended with a similar one containing no "black oxides" so as to produce several series of enamels containing increments of approximately 0.2% of a given black oxide. With each of these a series was formulated containing from 0-10% TiO₂ in 2% increments but added to the mill charge.

All enamels were prepared and applied by conventional methods to .030" ingot iron which had been cleaned and pickled without nickel

flashing. Specimens were fired in an electric laboratory furnace at 1600° F. for four minutes.

Testing for adherence was accomplished by deforming with a 0.9" steel ball and comparing the deformed area with a set of standards selected on the basis of the amount of base metal exposed.

The accompanying tables present the results obtained.

Discussion of results

High percentages of cobalt oxide along with high percentages of TiO₂ produced enamels of greater adherence than those containing low percentages of cobalt oxide and titanium dioxide. (Table I)

With nickel oxide, only in one or two enamels did titanium oxide appear to improve the adherence. (Table II)

Titanium oxide produced a slight increase in adherence when added to an enamel containing 0.6% cobalt oxide and 0.4% nickel oxide. (Table III)

Conclusions

Titanium dioxide when added in amounts of 6-10% in ground coat mill additions increased adherence when cobalt oxide is the sole adherence-promoting oxide, but with nickel oxide alone titanium oxide has practically no influence on adherence.

When cobalt oxide and nickel oxide are used in the proportions 0.6% Co₃O₄ and 0.40% NiO the adherence is high and 6-10% titanium oxide increases the adherence slightly.

Table III

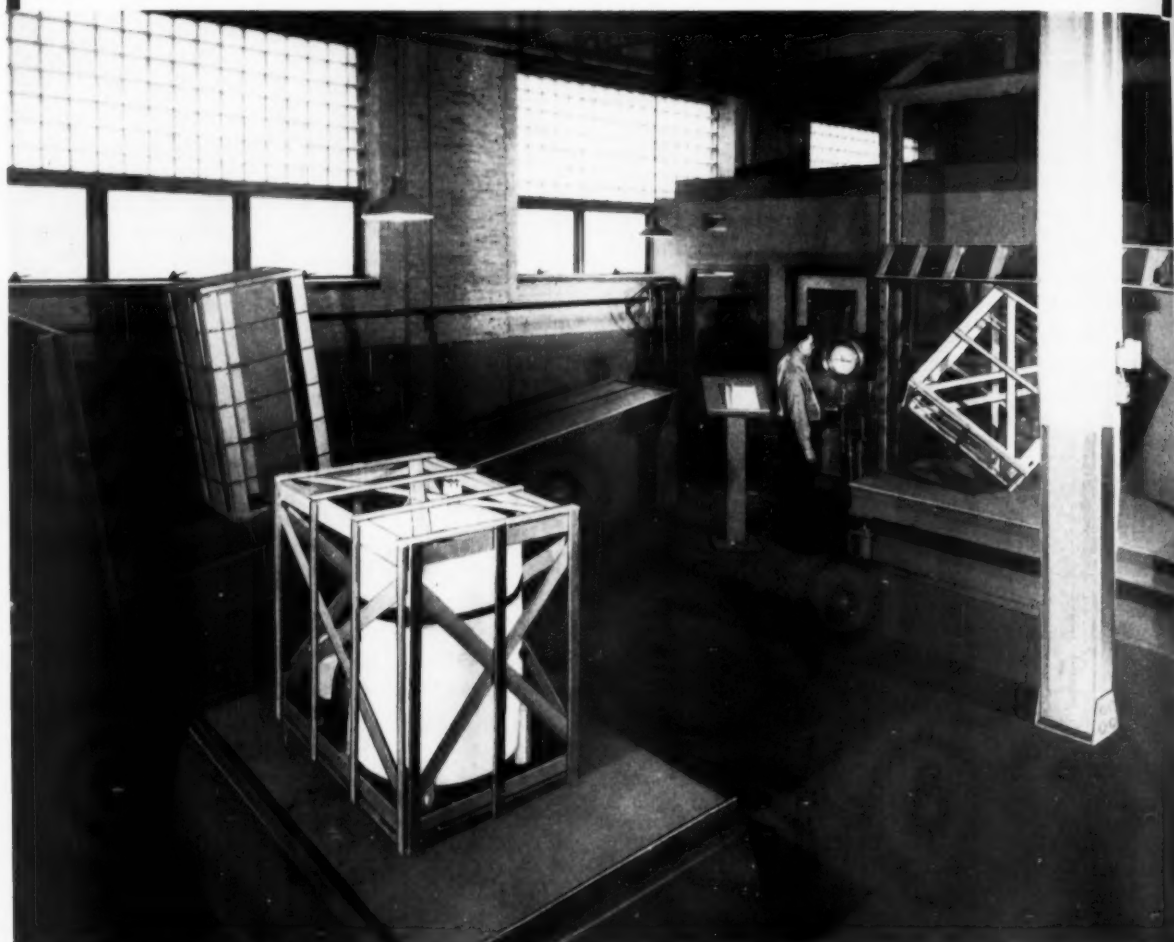
Adherence Evaluation of Cobalt Oxide-Nickel Oxide-Titanium Oxide Ground Coats

	0.0% TiO ₂	2% TiO ₂	4% TiO ₂	6% TiO ₂	8% TiO ₂	10% TiO ₂
0.6% Co ₃ O ₄	Adh-C C-Green	Adh-C C-Blue Green	Adh-C C-Green Brown	Adh-C C-Green Brown	Adh-C C-Brown Green	Adh-B C-Dark Brown
0.6% Co ₃ O ₄ 0.4% NiO	Adh-A C-Gray Black	Adh-A C-Dark Black	Adh-A C-Dark Black	Adh-A C-Dark Black	Adh-A C-Dark Black	Adh-A C-Dark Black
0.4% NiO	Adh-C	Adh-E C-Gray Black	Adh-E C-Gray Black	Adh-E C-Dark Black	Adh-E C-Dark Black	Adh-E C-Brown Black

SAFE TRANSIT

SAFE TRANSIT

SAFE TRANSIT



SECTION OF THE CHICAGO MILL AND LUMBER COMPANY TESTING LABORATORIES
THIS LABORATORY IS CERTIFIED BY THE NATIONAL SAFE TRANSIT COMMITTEE



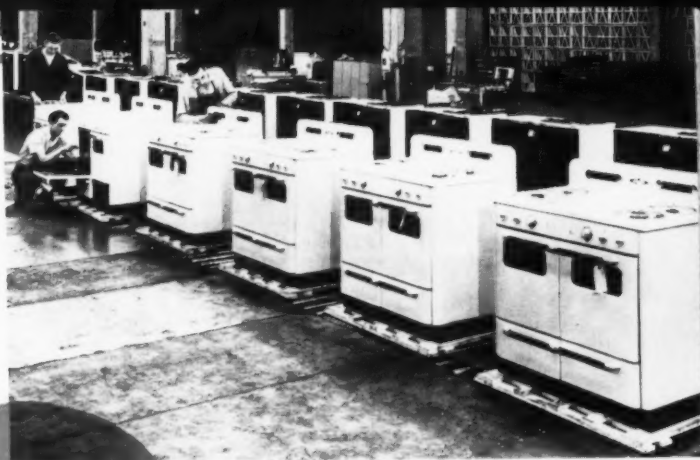
NAILED OR HINGED CORNER
PLYWOOD CRAVENEER WIREBOUND
CLEATED CORRUGATED
BOXES OR CRATES

CHICAGO MILL AND LUMBER COMPANY

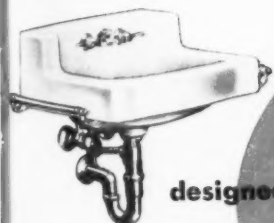
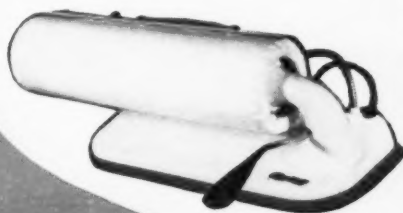
33 South Clark Street

Chicago 3, Illinois

Plants at: Helena, Ark. • Greenville, Miss. • Tallulah, La. • Rockmart, Ga. • Chicago, Ill.



The National SAFE TRANSIT Program



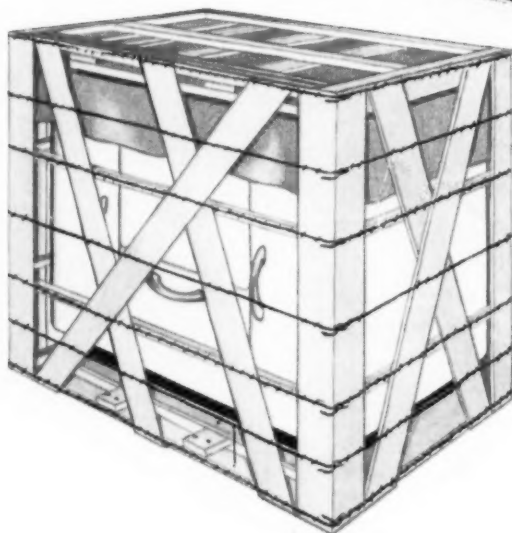
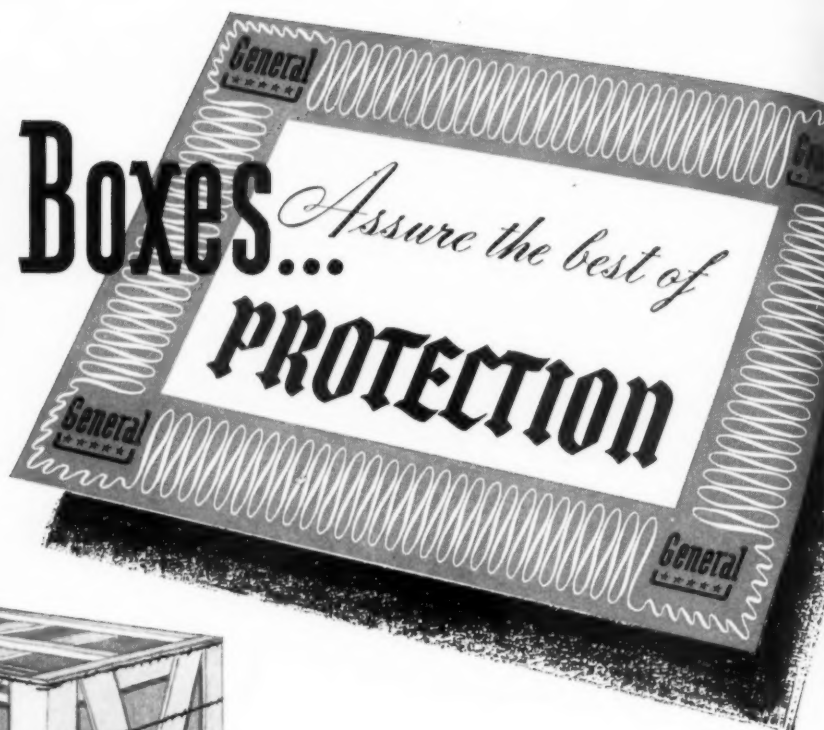
designed to deliver the finished product safely from the assembly
line to the final customer



SAFE TRANSIT

ish

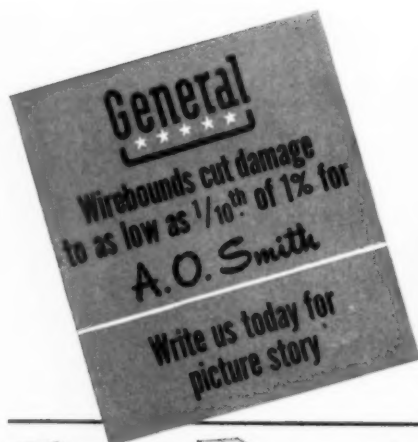
General Boxes...



for STOVES or STAMPINGS

or hundreds of other products

Let's quickly get down to cases, sir. Is your container lightweight yet extra strong? Is it quickly and easily assembled? Is it designed to your specific need? Does it give your product "the best of protection"? If the answer is "yes," then chances are you are using General Wirebounds. If not, better write us today.



BOX COMPANY

engineered shipping containers

GENERAL OFFICES:

514 N. Dearborn St., Chicago 10, Ill.

DISTRICT OFFICES AND PLANTS: Brooklyn, Cincinnati, Detroit, East St. Louis, Kansas City, Louisville, Milwaukee, Meridian, Sheboygan, Winchendon.

Continental Box Company, Inc.: Houston, Dallas.



General Wirebound Crate



General Nail Box



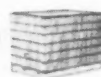
General Corrugated Box



General Cleated Corrugated Container



General All-Bound Box



General Lift Pallet and Pallet Box



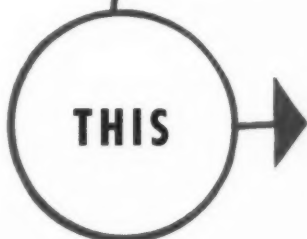
General Watkins-Type Box



*This is a result that may be expected when proper attention is not given to the problems of packaging and shipping -- before the **PACKAGED PRODUCT** is released by the manufacturer.*



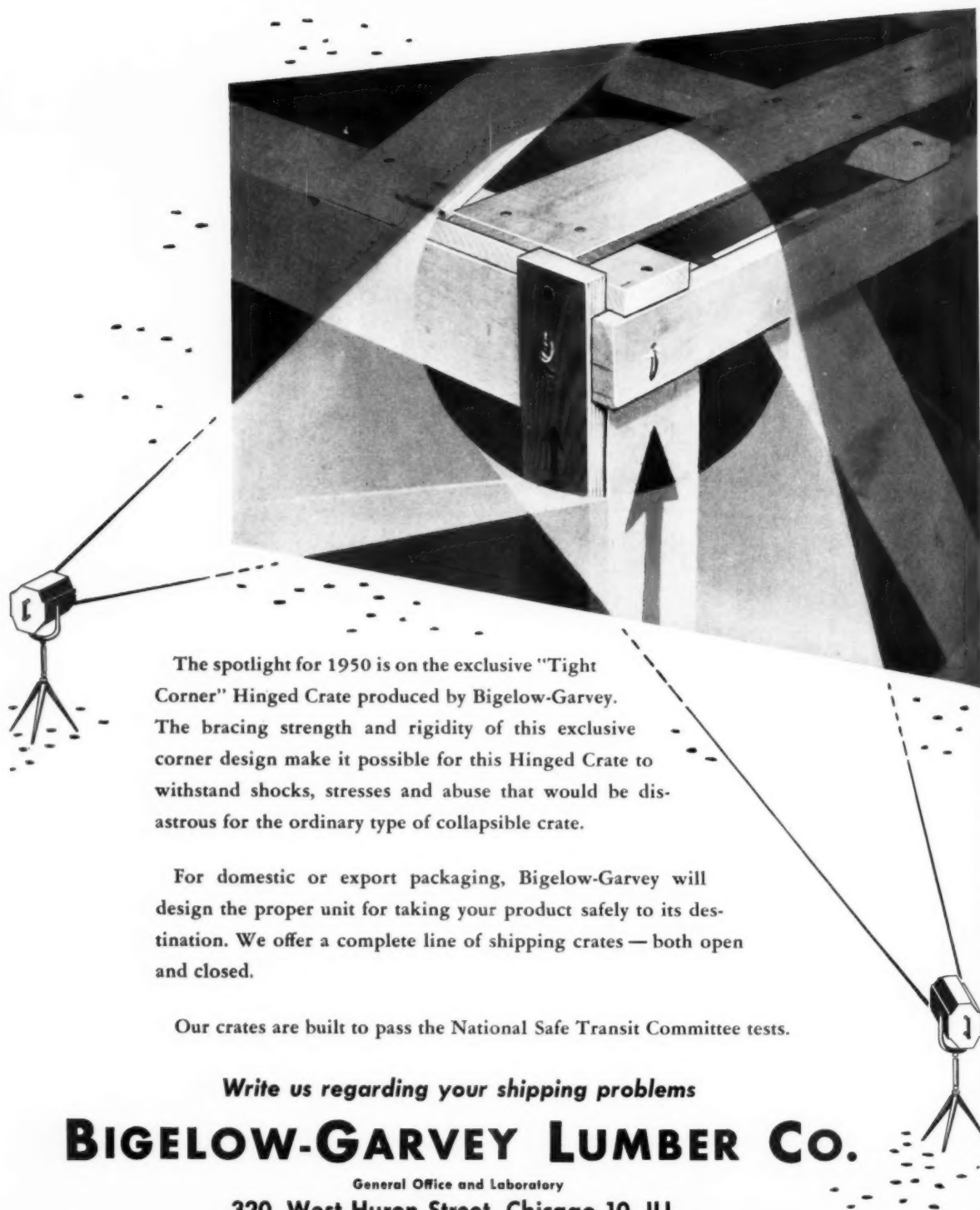
or the
NATIONAL SAFE TRANSIT PROGRAM
 and



The Safe Transit Program provides a workable plan for delivering major appliances and allied metal products safely to the point of use.



The Spotlight is on the "Tight Corner"



The spotlight for 1950 is on the exclusive "Tight Corner" Hinged Crate produced by Bigelow-Garvey. The bracing strength and rigidity of this exclusive corner design make it possible for this Hinged Crate to withstand shocks, stresses and abuse that would be disastrous for the ordinary type of collapsible crate.

For domestic or export packaging, Bigelow-Garvey will design the proper unit for taking your product safely to its destination. We offer a complete line of shipping crates — both open and closed.

Our crates are built to pass the National Safe Transit Committee tests.

Write us regarding your shipping problems

BIGELOW-GARVEY LUMBER CO.

General Office and Laboratory

320 West Huron Street, Chicago 10, ILL.

MILLS: ARKANSAS GEORGIA WISCONSIN MINNESOTA WASHINGTON

A cooperative program for reducing packaging and shipping losses

PREMISE: all manufacturing, engineering, and quality efforts are in vain if the product reaches its destination in a damaged condition

ALONG with the steady rise in volume and value of shipments of finished appliances and allied metal products, there has also been an increase in claims for damage in shipment of these products. As a result of the monetary loss sustained by both shippers and carriers because of this increase in losses and claims, and of its potential threat to the existing goodwill among manufacturers, carriers, and customers, the National Safe Transit Committee was initiated.

The basic objectives of the Safe Transit Committee are the expansion of a practical program for reducing damage to packaged finished metal products during handling and while in transit, and enlisting the cooperation of all manufacturers of these products for putting such a program into operation.

The Technical Planning Division of the Committee has developed technical procedure and equipment for testing, *before shipment*, the ability of packaged finished metal products to withstand normal handling from the production line to the consumer.

The Committee's program has received the wholehearted endorsement of the appliance industry, and the carrier and packaging organizations, on a national basis.

The manufacturers program (Projects I and I-A)

Industry's part in the cooperative program consists of a proven pre-testing plan for PACKAGED PRODUCTS that will predetermine their shipability and resistance to normal handling damage. Thus the manufacturer may know *in advance* whether his product is properly constructed and safely packed for shipment.

The Safe Transit Committee confines its activities to the testing of

PACKAGED PRODUCTS, neither the package nor the product separately. It is not the Committee's intent to interfere with the prerogative of the individual manufacturer in his design, fabrication or packaging techniques. Pre-shipment tests as devised will predetermine whether the PACKAGED PRODUCT will arrive at its final destination safely, and in the last analysis the successful shipment of the product will stand or fall on the performance of the whole. Structural strength built into an article to overcome inadequate packaging is costly and unreliable. Packaging strength sufficient to protect an article with a structural weakness is also costly and undesirable. In both cases, transit damage will likely be excessive. A change in the package, a change in the product, or a change in both—made on the basis of tests established by the Committee—are left wholly within the manufacturers' province.

Modest investment covers testing equipment

The manufacturer may install two simple pieces of test equipment for heavy units and a third for light units for conducting in-plant tests. (*Ap-*

proximate total cost of equipment is \$2000.00).

As an alternative, the manufacturer may rely on established laboratories for conducting the specified tests and certifying to the results.

The magnitude of the shocks imposed on a packaged unit by ordinary hazards in transportation and handling has been accurately measured by special instruments. The Safe Transit Pre-Shipment Test Procedures are based on the reproduction of these shocks in the testing laboratory, and, properly applied, they will show the "shipability" of the *packaged unit*. These are strictly performance tests. The manufacturer must then determine for himself causes of any failures—whether it is in his container, his product design, or both. Project I covers pre-shipment tests for packaged units weighing 100 to 1000 lbs. Project I-A is for packaged units less than 100 lbs. These tests are now being widely used by manufacturers seeking to reduce their shipping losses.

Complete details of the plan for major appliance and allied metal products manufacturers will be presented in a detailed description of the tests for Projects I and I-A.

to Page 80 →

STATEMENT OF POLICY

The National Safe Transit Committee is simply saying to shippers:

"If you will test your packaged products by these test procedures, experience has shown that your loss and damage and your packaging costs will be acceptable minimums. It is up to each shipper to decide whether or not he will use these test procedures. The program is entirely voluntary and implies no connection with tariffs, freight rates, claim procedures or any other existing transit regulations."

NATIONAL SAFE TRANSIT COMMITTEE
1010 Vermont Ave., N. W., Washington 5, D. C.

Safe Transit test equipment

PROJECT I (for packaged products over 100 lbs.)

Conbur incline impact testing device



Black arrow on crate indicates preferred position of ride recorder. Note position of instrument on a special mounting board attached the full width of the container and with instrument located nearest to point of impact. The impact test simulates the longitudinal shocks and impacts as received in actual shipment during various kinds of transportation.

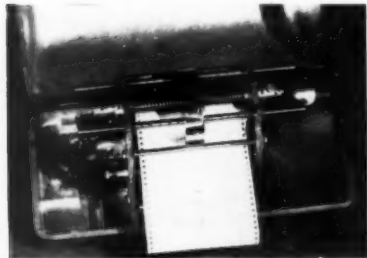
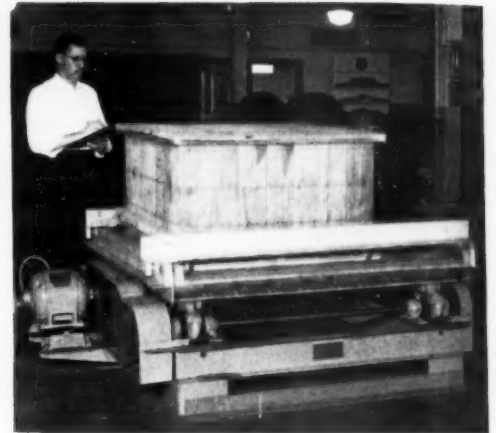


Photo shows interior of 2-way ride recorder used for determining shock. (This instrument is also used by the Technical Sub-Committee for correlating handling and in-transit results with N.S.T. laboratory tests.)

Vibration testing machine



This vibration test determines the ability of the packaged product to withstand vibrational shocks encountered during transportation. Conditions simulated include: resonance, flat car wheels, rail joints, rough road bed or roadways, card sideways, etc.

PROJECT I-A (for packaged products under 100 lbs.)

Actual Equipment Costs

Manufacturer "A"	
Conbur impact testing device	\$ 149.10
Vibration testing machine installed with variable speed drive & motor	1447.67
2-Way Ride Recorder (as of 2-1-49)	475.00
Total \$2071.77	

Manufacturer "B"

This company reports a total expenditure for all required equipment of:
Total \$1950.00

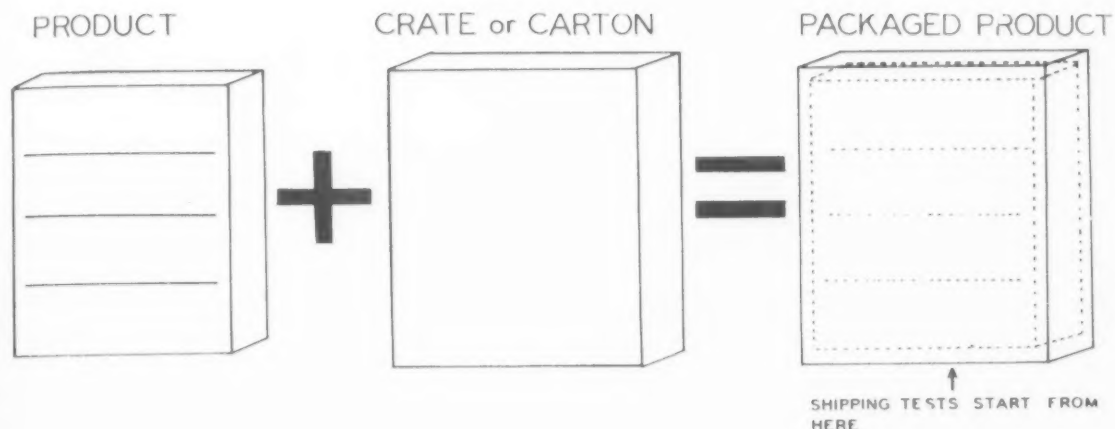
NOTE: Both of the above companies operate under Project I

The divided table drop tester for Project I-A costs approximately \$75.00.



This drop tester is used to simulate the shocks incident to the handling and transportation of packaged products under 100 pounds.

The Sub-Committee of the Technical Planning Division follows all installations of new equipment to make sure that its operation is thoroughly understood.



Testing procedure for Project I (as of January 1, 1950)

THIS procedure for Project I of the National Safe Transit Program, as developed by the Technical Planning Division of the National Safe Transit Committee, covers testing of packaged products weighing 100 to 1000 pounds as prepared for transportation, and supersedes all previous procedures.

Test cycle shall consist of:

1. Vibration Test
2. Impact Test

Tests shall be conducted in the above order.

Vibration test equipment

L. A. B. Package Tester or other equipment producing equivalent results.

Test procedure

The packaged product shall be placed on the table of the vibration tester; fences may be attached to the test table suitable for the product being tested. Vibration frequency shall be such that the packaged product leaves the table momentarily at some interval during the vibration cycle (equivalent to acceleration of "lg+"). The test shall be conducted for a minimum of one hour.

Note: A simple method of determining "lg+" is to advance the cycle of vibration until a thin piece of

cardboard can be inserted between one bottom edge of packaged product and the platform of the machine.

Impact (longitudinal shock) test equipment

The Conbur Incline testing device or other equipment producing equivalent results.

A shock recorder known as RS two-way recorder No. 2W 330, or equivalent.

Test procedure

The container to be tested shall be placed on the dolly with the face or edge which is to receive the impact projecting two inches beyond or flush with the forward end of the dolly.

The shock recorder shall be positioned on the packaged product to record the maximum shock received during the impact test. This instrument should be mounted on a special mounting board. The mounting board should be as long as the side of the container on which it is mounted. The recorder should be placed so that a center line through the length of the recorder is at right angles to the plane of the backstop. (On solid wooden boxes no mounting board is necessary).

When conducting the test the dolly and container shall be drawn up the

incline to the predetermined position (the position shall be such as to produce impact into at least the 1st quarter of the 5th zone of the shock recorder) and released. This test shall be repeated so that each face of the container and the bottom is subjected to the impact. This shall constitute a complete standard impact test. The position of the container on the dolly and the sequence in which the faces or edges are subjected to impacts may be at the option of the manufacturer and will depend on the packaged product under test.

The packaged product shall be considered to have satisfactorily passed this test, if the product is free from damage upon unpacking.

The number of Packaged Products to be tested is left to the judgment of the manufacturer; however, the sample should be sufficiently large to assure valid results.

Note: When it is desired to create a hazard to concentrate the impact at any particular point of the packaged product attach securely a 4 x 4 wood member across the face of the backstop at the point where it will make the desired contact.

next page →

Testing procedure for Project I-A

Testing procedure for Project I-A (as of January 1, 1950)

THIS procedure for Project I-A of the National Safe Transit Program covers testing of packaged products, both single and multiple packed, weighing under 100 pounds as prepared for transportation.

Test cycle shall consist of:

1. Vibration Test
2. Drop Test

Tests shall be conducted in the order indicated.

Vibration test equipment

L.A.B. Package Tester or other equipment producing equivalent results.

Test procedure and

performance limits

The packaged product shall be placed on the table of the vibration tester; fences may be attached to the test table suitable for the product being tested. Vibration frequency shall be such that the packaged product leaves the table momentarily at some interval during the vibration cycle (equivalent to acceleration of "lg+"). The test shall be run for a minimum of one hour.

Note: A simple method of determining "lg+" is to advance the cycle of vibration until a thin piece of cardboard can be inserted between one bottom edge of the packaged product and the platform of the machine.

Drop test equipment

The apparatus shall consist of the following:

- (a) Divided table top drop tester such as Acme Drop Tester or other equipment producing equivalent results.
- (b) Hoist with suitable sling tripping device. Surface on which package is to be dropped must be a flat firm base (such as steel, concrete, etc.).

Test procedure and performance limits procedure

The procedure for identifying faces,

edges and corners of containers shall be as follows:

- (a) Facing one end of the container, with the manufacturer's joint, if any, on the observer's right:

Designate the top of the container as one.

The right side as two.

The bottom as three.

The left side as four.

The near end as five.

The far end as six.

- (b) Identifying edges by numbers of two faces that form that edge:

Example:

1-2 identifies the edge formed by the top and right side.

2-5 the edge formed by the right side and the near end.

- (c) Identifying the corners by the numbers of the three faces that meet to form that corner.

Example:

1-2-5 identifies the corner formed by the top, right side, and the near end.

The packaged product shall be dropped from the prescribed height (see performance limits) in the following sequence which constitutes a drop test cycle:

- (a) A corner drop on the 5-1-2 corner.
- (b) An edge drop on the shortest edge radiating from that corner.
- (c) An edge drop on the next shortest edge radiating from that corner.
- (d) An edge drop on the longest edge radiating from that corner.
- (e) A flatwise drop on one of the smallest faces.
- (f) A flatwise drop on the opposite smallest face.
- (g) A flatwise drop on one of the medium faces.
- (h) A flatwise drop on the oppo-

site medium face.

- (i) A flatwise drop on one of the largest faces.

- (j) A flatwise drop on the opposite large face.

Performance limits

1. Weight of Packaged Product—50 pounds and under. Articles—Single or multiple packaged products such as washing machine tubs, table tops, stove panels, etc. Drop—24".

1a. Weight of Packaged Product—Over 50 pounds and under approximately 100 pounds.

Articles—as in 1.

Drop—12" minimum or 72" on Conbur (optional)*

2. Weight of Packaged Product—50 pounds and under.

Articles—Completely assembled products (and allied parts) such as roasters, cookers, hot-plates, etc.

Drop—18".

2a. Weight of Packaged Product—Over 50 pounds and under approximately 100 pounds.

Articles—As in 2.

Drop—12" minimum or 72" on Conbur (optional)*.

3. Weight of Packaged Product—50 pounds and under.

Articles—Holloware.

Drop—12" minimum.

3a. Weight of Packaged Product—Over 50 pounds and under approximately 100 pounds.

Articles—As above.

Drop—12" minimum or 72" on Conbur (optional)*.

The packaged product shall be considered to have satisfactorily passed this test, if upon unpacking, the product is free from damage.

The number of packaged products to be tested is left to the judgment of the manufacturer; however, the sample should be sufficiently large to assure valid results.

* If the use of Conbur Incline Testing Device is elected, the sequence of the test will be as described under Drop Test.

NATIONAL SAFE TRANSIT COMMITTEE ORGANIZATION CHART

National Safe Transit Committee

R. F. BISBEE, General Chairman
Westinghouse Electric Corporation
Mansfield, Ohio

COORDINATING GROUP

Technical Planning Division

E. H. SHANDS, Chairman
Geo. D. Roper Corporation
Rockford, Illinois

Advisory

E. C. MANTHEL
Impact Register Co.
Champaign, Illinois
H. G. D. NUTTING,
L.A.B. Corporation
Summit, New Jersey
W. B. KEEFE,
Westinghouse Elec. Corp.
Mansfield, Ohio
JAMES MUIRHEAD,
Easy Washing Machine Co.
Syracuse, New York

Technical Sub-Committee

P. W. BUSH,
Westinghouse Elec. Corp.
Mansfield, Ohio
F. A. PETERSEN,
University of Illinois,
Urbana, Ill.

Manufacturers Coordinating Division

L. A. ADAMS, Chairman
Chicago Vitreous Enamel
Product Co., Cicero, Ill.

Laboratory Coordinating Division

DUDLEY JONES, Chairman
Kaiser Metal Products, Inc.
Bristol, Pennsylvania

Educational Division

DANA CHASE, Chairman
Dana Chase Publications
360 North Michigan Avenue
Chicago, Illinois
C. B. WILLIAMS, Co-Chairman
Ferro Enamel Corporation
4150 East 56th Street
Cleveland, Ohio

Loading Research Division

M. F. WEBER, Chairman
Southern Express Co.
1333 South Iron St.
Chicago, Illinois

Secretarial Division

EDWARD MACKASEK
JOHN C. OLIVER
Porcelain Enamel Institute, Inc.
Washington, D. C.

Carrier Coordinating Division

E. H. SHANDS, Temporary Chairman
Geo. D. Roper Corporation
Rockford, Illinois

INDUSTRY GROUP

MANUFACTURERS

American Home Laundry Mfrs. Assn.

R. H. THOMPSON
Maytag Company, Newton, Iowa

Gas Appliance Mfrs. Assn.

HAROLD MASSEY
60 E. 42nd St., New York, N.Y.

Enameled Utensil Mfrs. Council

F. A. PETERSEN, Ceramic Dept.
University of Illinois, Urbana, Ill.

National Electric Mfrs. Assn.

EDWARD ZELINSKI, Hotpoint, Inc.
227 S. Seeley St., Chicago, Ill.

Inst. of Cooking & Heating Appliance Mfrs.

S. V. DUNCKEL, Shoreham Hotel
Washington, D. C.

National Electric Sign Assn.

M. R. ELY, 224 So. Michigan Ave.
Chicago, Illinois

Porcelain Enamel Institute

E. H. SHANDS, Geo. D. Roper
Corporation, Rockford, Ill.

CARRIERS

Assn. of American Railroads

A. L. GREEN
59 East VanBuren Street
Chicago, Illinois

Railway Express Agency

A. E. DOWLING
212 East 43rd Street
New York, N. Y.

American Trucking Assns., Inc.

John M. Miller
1424 - 16th Street, N.W.
Washington, D. C.

Air Cargo, Inc.

EMERY F. JOHNSON
National Airport
Washington, D. C.

CONTAINER MFRS.

Wirebound Box Mfrs. Assn.

L. S. BEALE, Room 1824
105 So. LaSalle St.
Chicago, Illinois

Society of Industrial Packaging and Materials Handling Engineers

C. J. CARNEY, JR.
20 West Jackson Blvd.
Chicago, Illinois

Fibre Box Assn.

H. S. ADLER
224 So. Michigan Ave.
Chicago, Illinois

National Wooden Box Assn.

C. D. HUDSON
Barr Building
Washington, D. C.

Assn. of Mfrs. of Watkins Shipping Containers

J. R. WATKINS
7840 Kenneth Ave.
Skokie, Illinois

M. F. WEBER, *Chairman,*
Loading Research Division



E. H. SHANDS, *Chairman,*
Technical Planning Division

F. A. PETERSEN
Technical Sub-Committee, also
Enameled Utensil Mfrs. Council



L. A. ADAMS, *Chairman,*
Mfrs. Coordinating Division



DUDLEY JONES, *Chairman,*
Laboratory Coordinating Division

C. B. WILLIAMS, *Co-Chairman,*
Educational Division



M. R. ELY
National Electric Sign Assn.



JOHN C. OLIVER
Secretarial Division

THE SAFETY COMMITTEE PERSONNEL

(Photos of Committee personnel not shown)

Additional photos on following page

C. J. CARNEY, JR.
Society of Industrial
Packaging & Materials Handling Engineers



R. F. BISBEE, General Chairman,
National Safe Transit Committee

EDWARD MACKASEK, Chairman,
Secretarial Division



R. H. THOMPSON
American Home Laundry Mfrs. Assn.



EDWARD ZELINSKI
National Electric Mfrs. Assn.

L. S. BEALE
Wirebound Box Mfrs. Assn.



HAROLD MASSEY
Gas Appliance Manufacturers Assn.



A. L. GREEN
Association of American Railroads

TRANSIT PERSONNEL

(Persons not shown were unavailable at press date.)

photos on following page

P. W. BUSH
Technical Sub-Committee



C. D. HUDSON
National Wooden Box Association

E. F. JOHNSON
Air Cargo, Inc.



J. M. MILLER
American Trucking Associations, Inc.



J. R. WATKINS
Assn. of Mfrs. of Watkins Shipping Containers



JAMES MUIRHEAD
Advisory Staff



H. G. D. NUTTING
Advisory Staff



E. C. MANTHEI
Advisory Staff



W. B. KEEFE
Advisory Staff



What they say about the National Safe Transit Program

"reduced shipping damage"

A. J. Lindemann & Hoverson Co.
Milwaukee, Wisconsin

We had always used the Conbur tester for our crate development work but no vibration tests had been applied to our product except those that were encountered in test shipment. After we purchased a vibrator we found that certain weaknesses existed in our product or its packing of which we had not been aware . . .

Your plan for reducing shipping damage to appliances and other metal products is bound to work if those participating carry out your recommendations. *We have done all the things that you are recommending and our experience in reducing ship-*

ping damage has been very gratifying. We will be glad to cooperate with you in any way we can in carrying out your program.

R. H. Meiners
Chief Engineer

"led to better crate design"

The Tappan Stove Company
Mansfield, Ohio

The standard tests (vibration and impact) have led us to a better crate design. Fortunately, *the new crate which was designed to resist the standard tests turned out to be less expensive than the old one.*

The new crate has proved itself by almost entirely eliminating the break-

age we used to get in carload shipments. A damage report on a carload now is indeed a rarity.

G. L. Dobson
Chief Production Engineer

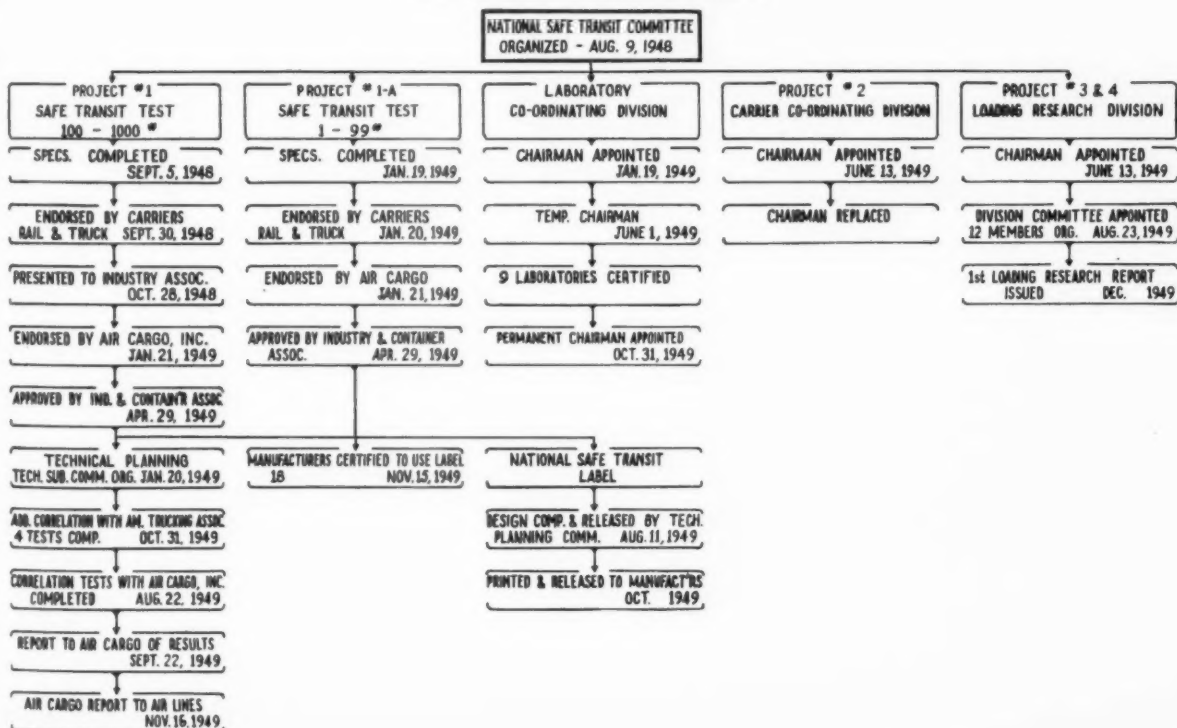
"gaining attention & respect"

A. O. Smith Corporation
Kankakee, Illinois

You will find attached our application for use of the National Safe Transit Certification Label on our automatic water heaters, both gas and electric. You will note in our application that we have the necessary testing equipment to test for certification in our plant. You will also

to Page 46 →

FLOW CHART OF PROGRESS NATIONAL SAFE TRANSIT COMMITTEE



Safe Transit LABEL

for certified manufacturers

PRE-TESTED SAFE TRANSIT SHIPMENT

This PACKAGED PRODUCT meets the pre-testing standards established by the National Safe Transit Committee and will withstand ORDINARY transportation and handling hazards.

NATIONAL
SAFE TRANSIT
COMMITTEE



1010 VERMONT AVE., N. W.
WASHINGTON 5
D. C.
©

MAKE SAFE HANDLING YOUR JOB !

First list of manufacturers certified to use the Label

American Stove Company
Automatic Washer Company
Canton Stamping & Enameling Co.
Crunden Martin Mfg. Company
Kaiser Metal Products, Inc.
Lisk-Savory Corporation
A. J. Lindemann & Hoverson Co.
Landers, Frary & Clark
Malleable Iron Range Company

The Moore Enameling & Mfg. Co.
Murray Manufacturing Co.
National Enameling & Stamping Co.
Norge Division, Borg-Warner Corp. (Effingham)
Norge Division, Borg-Warner Corp. (Muskegon Heights)
Philco Corp., Refrigerator Division
Republic Stamping & Enameling Co.
Geo. D. Roper Corporation
A. O. Smith Corporation
The Tappan Stove Company (Mansfield)
Westinghouse Electric Corp. (East Springfield)
Westinghouse Electric Corp. (Mansfield)

Scores of additional manufacturers are employing the Safe Transit test procedure. It is expected that many of these will be certified to use the label as the results of their early testing become known.

(See list of Certified Safe Transit Laboratories on Page 30.)

NATIONAL SAFE TRANSIT COMMITTEE

This certifies that

GEO. D. ROPER CORP.

ROCKFORD, ILLINOIS

has accepted and will conform to the testing procedures of the National Safe Transit Program and is hereby authorized to use the National Safe Transit Label on packaged units so tested.

from JULY 1, 1949 to DECEMBER 31, 1949



N. B. Bisbee
Chairman
E. J. M. [Signature]
Secretary

Date July 1, 1949



A. J. Lindemann & Hoverson Co., Milwaukee — R. H. Meiners, chief engineer, observes the application of the first Label to an I.&H electric range crate.

Applying the first SAFE TRANSIT LABELS



Norge Division, Borg-Warner Corp., Effingham — Harry J. Holbrook, director of electric range and heater division, was on hand to witness the application of the first Safe Transit Label to a Norge range crate. Richard E. Heine, left, chief inspector of the plant, is in charge of the local Safe Transit Program.



Westinghouse Electric Corp., East Springfield — Westinghouse water coolers now carry the Safe Transit Label. A packer applies the Label as F. C. Heyl, manager of quality control, looks on approvingly.



Geo. D. Roper Corp., Rockford — M. A. Ritchie, of Roper, points to the Safe Transit Label which is now being used on the company's packaged products. At left are Samuel Key, chief clerk, and L. G. McAdams, agent, both of Railway Express Agency.

→ from Page 43

note that we have indicated that we would test under Project I and expect to test approximately three per cent of our crated products.

We are at present following the test procedure as outlined for Project I with our crated product.

We have had many indications in the field that this Safe Transit Program is gaining wide attention and respect. As previously stated, we want

to say again that we are 100% for this program and would like to be helpful in any way possible.

Waldo Higgins
Chief Engineer

"application for certification"

Philco Corporation
Philadelphia, Pennsylvania

We have followed with interest the development and work of the Safe

Transit Committee, and have used a closely parallel pre-shipping test procedure to that recommended by your Committee, and are very happy to have the opportunity of cooperating in this program by making application for the certification of the Refrigeration Division of Philco Corporation. We are forwarding directly to the Washington office the application for certification signed by Mr. Peltier (Director of Engineering Division).

We thank you very much for the opportunity of associating ourselves in this manner with the Safe Transit Committee program.

J. Gardner Crowell
Packing and Crating Engineer
Appliance Division

"proof of reduced damage"

The Moore Enameling & Manufacturing Company
West Lafayette, Ohio

We desire to take this occasion to compliment the National Safe Transit Program on the most constructive work done in connection with the testing of packaged products under Project I-A.

Our company followed this from the inception, purchased the Drop Tester early in the game, and have since completed the revamping of our packaging to meet these standards.

Positive proof of the reduction of damage has been obtained by specific customers, and the general reaction of the trade and reduction in damage reports proves the worth of this effort.

It will continue to have our wholehearted support.

E. F. Stahl
Executive Vice President

"great reduction in shipping damage"

American Stove Company
St. Louis, Missouri

By using the Conbur incline test equipment and the L.A.B. vibration table in the manner specified in Project I, we have been able to discover faults in the assembly and crating of



An Important Unit in the "Safe Transit" Program Used in the Laboratory and in the Field

THE R-S Two-Way Ride Recorder meets all of the specifications adopted by the Porcelain Enamel Institute in their standard test procedure. Same sturdy design that has been used so successfully during the past twenty-eight years by both railroads and shippers. A simple and reliable instrument.

The amount of savings realized by many manufacturers who have used this recorder in accordance with the PEI testing procedure are enormous. One manufacturer has reduced losses from 28% to less than 1% because of the adoption of this "pre-transportation" testing. Another manufacturer making 80,000 units per year reports a saving of over \$1 per unit because of saving in more effective, but cheaper and simpler, design of merchandise and crating.

Participate in the "Safe Transit" program as many others are doing. Write for more information on how YOU can save money and protect your products in transit.

"Now available with 16 day clock movement"

THE IMPACT REGISTER CO.
CHAMPAIGN, ILLINOIS

our ranges. These changes have been in effect since the first of 1949 and we have already seen a great reduction in shipping damage.

We have had the Conbur equipment in our plant for two or three years. We have had the vibration table for approximately eight months. However, we were unable to find any procedure which would correlate the test results with the actual field conditions until the issuance of the information covered by Project I . . . We had been using two one-way shock recorders in our shipments. These gave us some information, but not enough. We purchased a two-way shock recorder. This, of course, has enabled us to obtain all the necessary information in our tests.

To repeat, the damage to our shipments since the first of the year (1949) has been very much less than previous shipments. We wish to express our thanks to all those who participated in the work involved in Project I. It has been of invaluable assistance to us.

L. S. Kauffman
Quality Control Director

"packaging that represents savings"

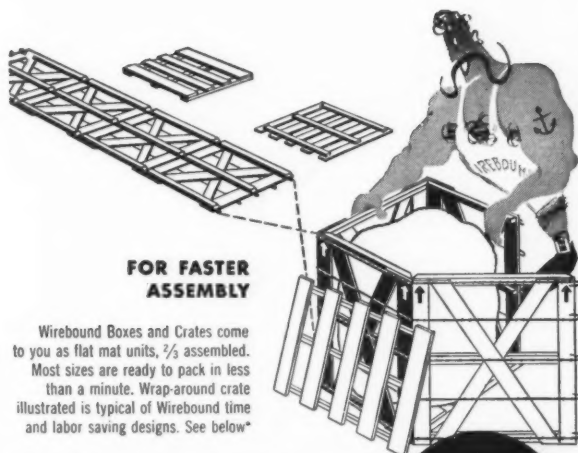
The Republic Stamping & Enameling Co.
Canton, Ohio

We have now had enough experience with the National Safe Transit Program so that we can appreciate the value of the program to us.

We feel that the program has brought us a lot of benefit in several directions. Like others in this industry, we have felt for some time that we know a good deal about packing enameled ware. Our carton suppliers were willing to go along pretty much in the same way that we have and for some time there were not too many new ideas being presented about packaging.

The immediate effect of the Safe Transit program was to get us to re-examine our ideas and practices about packaging. We have our own drop testing machine and we have had tests conducted by outside laboratories also. To tell you the

finish **JANUARY • 1950**

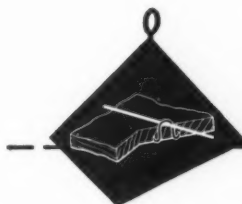


FOR FASTER ASSEMBLY
Wirebound Boxes and Crates come to you as flat mat units, 7/8 assembled. Most sizes are ready to pack in less than a minute. Wrap-around crate illustrated is typical of Wirebound time and labor saving designs. See below*

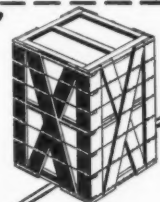
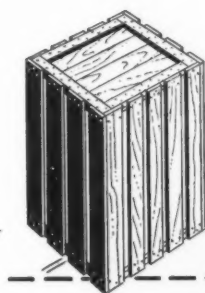


FOR ESSENTIAL PROTECTION

Time-tested, resilient Wirebounds combine the strength of steel with thinner wood. Thickness of boards, arrangement of reinforcing battens, style of cleats, and number and gauge of wires vary with the type and weight of product carried. See below*



FOR LOWER COSTS



A typical user reports Wirebounds reduce tare weight 33%, provide over-all shipping room savings of 25%, slash storage requirements 80%, cut assembly and packing time 50%. Wirebounds will deliver your goods safely and at lower cost.*

USE

60 Wirebound Plants throughout the United States

Wirebound
BOXES & CRATES
FOR LOWER TOTAL SHIPPING COSTS

*Send for free book . . . contains complete details of Wirebound advantages, technical features and describes how Wirebounds are designed specifically to meet your requirements. Mail coupon today!

Wirebound Box Manufacturers Assn., Room 1832, Borland Bldg., Chicago 3, Ill.

☐ Send Booklet of Product Information ☐ Send a Sales Engineer

NAME _____ ADDRESS _____
COMPANY _____
CITY _____ ZONE _____ STATE _____
OUR PRODUCT IS _____

truth, we have been very much surprised in what we have seen in these tests.

We know for instance now that internal packing is in many cases more important than external packing. We know also that the more expensive carton is not necessarily the better carton and *we have been pleasantly surprised at being able to develop some ways of packing that actually represent savings.*

We feel sure that the overall re-

sults of the program already is reflecting in a reduction in the amount of damage our ware suffers in transit. We intend to continue with the program and we heartily endorse the efforts of your group. We think it should be a great mistake to cut down in any way the activity of the National Safe Transit Program and we believe that it is bound to be of considerable benefit to all of us.

We naturally hope that the carriers themselves will improve their own

practices so that the benefits of our efforts will not be lost through careless handling on their part.

W. H. Allman
Works Staff Manager

"excellent work and progress"

Landers, Frary & Clark
New Britain, Connecticut

I have followed with great interest the Industries' Cooperative Plan for reducing shipping losses. Your committee is to be congratulated for excellent work and progress on a problem that has plagued our industry for many years.

At the present time, we are daily making use of the majority of testing equipment outlined in the preliminary recommendations of the Packaging and Shipping Committee, and you can be assured that we will give every support to the final draft of approved standards.

H. E. Allen
Chairman of the Board

"remarkable results"

The Strong Manufacturing Co.
Sebring, Ohio

We heartily endorse your program and feel it is a step in the direction not only to reduce freight claims, but also damaged ware . . .

The results to date in connection with this tremendous task are remarkable and we feel that a vote of thanks should be given to the Committee and to Mr. Bisbee for the splendid job that they have done.

W. H. Metz
Executive Vice President

"has proved invaluable"

Newark Stove Company
Newark, Ohio

We have used the Incline Impact Test and Vibration Test for seven years. *Every piece of crated new merchandise is pre-tested.*

As an example, if we were to build 15,000 heaters for stock, and then find by test that the crates were not properly designed or braced, we could

**IT'S WHAT YOU NEED--
NOT WHAT WE HAVE--
THAT'S IMPORTANT**



We don't have to try and sell you what we have, because we have just about everything.

SUPERSTRONG comprises a complete line of wirebound, wooden and corrugated fibre boxes or crates. They are designed and fitted to your product-with no need to try and fit your product to a ready-made box.

The improved design and sturdy materials of all **SUPERSTRONG** shipping containers give you not only increased protection, but increased economy. Let us tell you all the whys and wherefores.



WIREBOUND BOXES and CRATES
WOODEN BOXES and CRATES
CORRUGATED FIBRE BOXES
BEVERAGE CASES
STARCH TRAYS
PALLETS

RATHBORNE, HAIR AND RIDGWAY COMPANY
1440 WEST 21st PLACE • CHICAGO 8, ILLINOIS

have a loss on every heater. By pre-testing, we preclude this possibility and, in addition, discover any product design failure.

This equipment, part of which can be built in any carpenter shop, has proved itself invaluable during the past seven years. One additional desirable result is that we do not "over-build" our crates.

F. H. Guthrie
President

"teamwork is required"

Hotpoint, Inc.
Chicago, Illinois

We know that freight claim prevention is a big "must" for both shipper and carrier alike, and in order to handle the job effectively, considerable teamwork and "pulling together hard" is required.

It is felt that the program outlined under Project I is a shipper step in the right direction towards eventual conquest of the freight claim problem, and corresponding efforts on the part of carriers should relegate "freight claims" to a level of unimportance.

It is our sincere wish that the objectives of the Packaging and Shipping Committee in this program be reached successfully.

J. G. Borson
Traffic Manager

"the right idea"

Norge Division, Borg-Warner Corp.
Effingham, Illinois

We think you certainly have the right idea on the way you approach shipping damage. . . . We are doing everything possible to reduce damage, and we are glad to cooperate with the National Safe Transit Committee on the present program as well as on any future ones.

R. E. Heine
Chief Inspector

"no increase in cost necessary"

Enameled Utensil Mfrs. Council
Urbana, Illinois

As the National Safe Transit Committee began to function, the E.U.M.C.

finish JANUARY • 1950

9 out of 10 companies can save by packaging with ACME STEELSTRAP

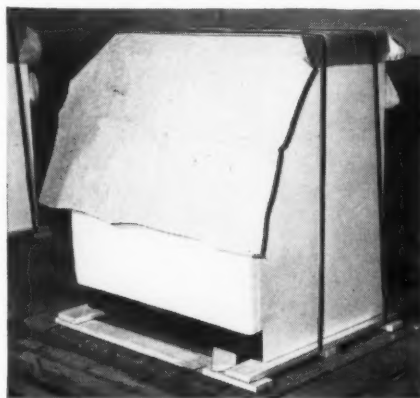
Read how Westinghouse Electric Corporation saves 30c per unit!

This famous manufacturer uses two flat steel straps to easily and quickly secure each Laundromat to a skid base before crating. This eliminates interior blocking and reduces the amount of padding, with a clear-cut savings of 30c per unit, and assures protection.

Naturally, every manufacturer wants his products delivered in perfect condition. Acme Steelstrap helps assure product protection at a definite savings.

Over 45,000 other users of Acme Steelstrap report similar savings of time, labor, and packaging materials. You can probably do the same. Why not ask an Acme Shipping Specialist to look over your packaging and shipping operations? There's no obligation. Or mail the coupon today for further details.

Westinghouse
Laundromats,
securely strapped to
skid bases, are easily
and quickly handled
by fork trucks.



STRAPPING DIVISION
ACME STEEL COMPANY

NEW YORK 17 ATLANTA CHICAGO 8 LOS ANGELES 11

ACME STEEL COMPANY, Dept. FI-10
2838 Archer Avenue, Chicago 8, Illinois
☐ Have representative call.
☐ Send free booklet, "Savings in Shipping."

Name _____

Company _____

Address _____

City _____ Zone _____ State _____

was pleased to appoint a representative to serve on the Committee. As the program has progressed, the E.U.M.C. has been heartily in favor of the work of the Committee and has indicated to its representative on the Committee that full cooperation would be given by the industry.

All of the packages in the enameled utensil industry are less than one hundred pounds and a very large majority are under fifty pounds. The industry was therefore primarily in-

terested in Project I-A covering the testing of packages under one hundred pounds.

From the very first application of these tests it was found that a great many "packs" must be changed. In each plant a great deal of data has been accumulated and each new "pack" is carefully tested before it is approved. It has been found that savings in packaging costs are made on some "packs" while others cost more, but in general no increase in

cost is necessary.

The greatest change has been to improve the inner packing. Generally, this improvement is obtained by the use of die cuts and separators.

In talking to the various members of the E.U.M.C., they all indicate satisfaction with the results of the program thus far. *The general feeling in the industry is that this program will be of greater value than any other in which they have participated.*

F. A. Petersen
Special Research Professor
University of Illinois

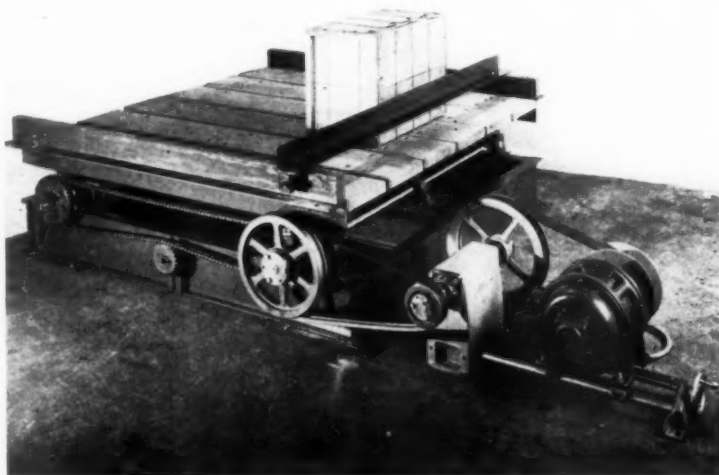
Loss, Damage and Packaging Costs

Have Positively Been Reduced

By Package Testing

Under the Rules of the

NATIONAL SAFE TRANSIT COMMITTEE



L.A.B. VIBRATION TESTERS

and

L.A.B. IMPACT TESTERS

SIMULATE AND REPRODUCE THE KNOCKS, BUMPS, JARS AND VIBRATIONS OF TRANSPORTATION AND HANDLING.

TO SAVE MONEY AND HEADACHES

INSTALL THIS TEST EQUIPMENT AND DETERMINE THE SHIPABILITY OF YOUR PACKAGES IN A FEW MINUTES IN YOUR OWN PLANT.

L.A.B. CORPORATION

UNION PLAZA

SUMMIT, N. J.

"makes a traffic manager happy"

Westinghouse Electric Corporation
Pittsburgh, Pennsylvania

Any action your committee can take to reduce loss and damage in transit makes a traffic manager happy.

No customer is ever happy when merchandise he wants to sell arrives in an unsalable condition.

As a traffic man, I am most happy to applaud the splendid, sensible, down-to-earth practical approach to the problem of "safe transit".

Your program, needless to say, has my wholehearted endorsement.

Wesley H. Lees
Traffic Manager

"more than justifies the investment"

Hotpoint, Inc.
Chicago, Illinois

Hotpoint was one of the first to adopt the National Safe Transit Program of pre-testing packaged appliances before releasing them for shipment.

We have an engineer whose sole responsibility is to conduct the standard Safe Transit tests on all of our major appliances. On the range, for instance, we have conducted the specified tests, using the vibration machine and the Conbur incline-impact tester. In addition, it is standard practice to take a range from the crating conveyor line periodically

and subject it to the standard testing procedure.

This plan has brought to light a number of important facts in relation to our packing procedure. It has also enabled us to make definite constructive suggestions to the design engineering department.

Our experience with the Safe Transit testing plan would indicate that it more than justifies the investment required to install the equipment and procedure.

Edward Zelinski
Packaging Engineer

"extensive tests and complete records"

Crunden Martin Manufacturing Co.
St. Louis, Missouri

With reference to the way in which the National Safe Transit Program was helping us, we wish to advise that *we have made extensive tests on our packages and kept a record of each one showing just wherein difficulty or failure took place. Many passed the test whereas some did not and on these improvements will have to be made. We shall make the necessary changes that the tests indicated.*

We have already applied for certification under Project I-A.

E. A. Schwarz
Vice President

"important contribution to scientific processing and handling"

Society of Industrial Packaging and Materials Handling Engineers
Chicago, Illinois

The Society of Industrial Packaging and Materials Handling Engineers believes that *the Safe Transit program . . . is immensely worthwhile and an important contribution to the advancement of scientific product processing and handling.* We salute the organizations, companies, and individuals who have fostered and participated in this program.

As a national group, our society will cooperate in furthering this program and will distribute to its mem-

finish JANUARY • 1950

bership any summary of the program which will make available information on this purpose.

Joseph H. Singer
Vice President

"something to shoot at"

Association of Manufacturers of Watkins Shipping Containers
Skokie, Illinois

If you have a set of tests to follow in your industry, then box manu-

facturers can design their containers, test in the laboratories, and meet the test required—and then we have something to sell. If the container does not meet it, we can redesign so it will. What I like about the whole thing, and why my group likes the plan, is the fact that now they have something to shoot at, and they can have a container to meet that with a minimum specification.

J. R. Watkins

More comments on Page 76 →

FIBER-and-STEEL STRAP CUSHIONS AS IT BINDS



For Internal Bracing

Prevents Shipping Damage

Cuts Shipping Costs

FIBER-and-STEEL is steel strap with a cushion of protective Kraft paper around it. You can apply FIBER-and-STEEL directly on the enameled surfaces of stoves, refrigerators and other similar products with *no cushioning needed* between the product and the strap. The outer layers of Kraft paper protect the surface. The inner layer of steel strap binds with a slip-proof grip.

FIBER-and-STEEL saves time and materials in packing, makes uncrating easy, and leaves no adhesive stains. It is secured with a soft aluminum Gerrard seal.

**WRITE OR WIRE TODAY
FOR A TEST DEMONSTRATION
IN YOUR PLANT**



1958 Hawthorne Place, Melrose Park, Ill.
(Chicago Suburb)

**FIBER-and-STEEL
IS USED BY**

- Crown Stove Co.
- Perfection Stove Co.
- Odin Stove Co.
- Dixie Foundry
- Norge Division
- Mt. Vernon Furnace & Mfg. Co.

NATIONAL SAFE TRANSIT COMMITTEE

Application for Certification

(Manufacturer)

NATIONAL SAFE TRANSIT COMMITTEE
1010 Vermont Ave., N. W.,
Washington 5, D. C.

Gentlemen:

The hereby
(Company)
applies for certification to use the National Safe Transit Program for pre-testing
Packaged Products and submits the following information relative to such use:

1. Testing procedures will be carried on

a. By a Safe Transit Certified Testing Laboratory: ☐

(Laboratory)

b. In our own plant: ☐

2. We have the following test equipment:

a.

b.

c.

d.

3. We will be testing under:

a. Project I (100 lbs. or more)

b. Project I-A (less than 100 lbs.)

We hereby affirm that the testing procedures will be in conformity with the
provisions of Project I and Project I-A in the manner and sequence prescribed by
the National Safe Transit Committee.

Company

Date

By

Company address Products manufactured

..... Mail Safe Transit information to Mr.

NOTE: Certification entitles the certified to use the official Safe
Transit Label. All labels must be purchased from the National Safe
Transit Committee, 1010 Vermont Ave. N. W. Washington 5, D. C.

Emulsion and alkaline cleaning

posing some pertinent questions for the research laboratories

by *A. J. Holloway* • CERAMIC ENGINEER, GEO. D. ROPER CORPORATION, ROCKFORD, ILL.

METAL cleaning is one of the greater problems in the porcelain enameling industry. With the progress made in recent years in lighter application weights, one coat white over ground coat and one coat white direct to steel, the cleaning of the metal becomes increasingly important.

Alkaline cleaners are designed to remove vegetable oils and shop dirt by saponification and mechanical action. If mineral oil is to be removed, this type of cleaner does not function properly and an emulsion type cleaner should be used.

Pre-cleaning

If we are to remove considerable quantities of mineral oil from the ware, it is thus necessary to set up another cleaning solution ahead of the alkaline cleaners. This may be accomplished by having a washer in the press room ahead of any welding operations. An emulsion type cleaner used here will assure the removal of the oil and leave a surface that may be easily and thoroughly cleaned by an alkaline cleaner. If it is impractical to use a washer in this manner, an emulsion cleaner can be used ahead of the alkaline cleaner in the pickle line. Thorough rinsing before the alkaline cleaner is necessary.

To accomplish complete removal of soil from the surface of the steel, it is first necessary to control the material applied to the sheet steel during fabrication. We have found by experience that the enamel plant should handle and determine what drawing compounds shall be used by the fabricating department. Naturally, the compounds used must satisfy the requirements of the press room but the

enamel plant has the final responsibility of complete removal of this compound before enameling. To keep cleaning cost down, it is also neces-



A. J. HOLLOWAY

sary to use dry sheets from the mill for fabrication of all parts to be porcelain enameled. If this is not done, it then becomes necessary to set up cleaning solutions to remove all types of oils coating the sheets.

One question keeps coming up to those concerned with cleaning. How do we know when the metal surface is clean? Is the absence of water and acid breaks sufficient evidence that the metal is clean?

Needed—a practical check test for clean metal

We tried several tests attempting to determine the answer to this question. A clean metal surface dipped in water after acid pickling should rust rapidly and evenly. In checking this method, we found that parts which showed acid breaks rusted as readily as those parts which showed no

breaks. We also tried to copper plate sheets by dipping them in a 5% copper sulfate-5% sulfuric acid solution to determine whether we could find evidence of degree of cleanliness in the condition of copper coating. Here we found that we could plate copper as well over sheets coated with drawing compound as we could over clean sheets. We are still searching for an accurate method to determine when the metal surface is actually clean.

In an effort to determine the steps necessary to assure good cleaning, we ran a series of tests using three well known alkaline cleaners, one alkaline cleaner with an emulsion addition and two emulsion cleaners.

We found that we could add over 5 oz. per gallon of drawing compound to all cleaners and still get ware that was free from water or acid breaks. When this much compound was added, the cleaner solutions became thick and difficult to control. The accumulation of this much compound is certainly not recommended as any criterion for discarding a cleaner tank.

The parts put in the emulsion cleaners required immersion in an alkaline cleaner to produce ware free of water and acid breaks.

In a test to determine the influence of mineral oils on cleaning, we found that the alkaline cleaners broke down when less than 1/2 oz. per gallon of mineral oil was added and produced ware showing acid breaks. The alkaline emulsion cleaner failed at 1 1/2 oz. per gallon. The two emulsion cleaners showed no decrease in cleaning ability when as much as 3 oz. per gallon of oil was added if the ware was then rinsed and put through an



This unassembled rubber ring and suction apparatus is part of equipment used in the photometric method of determination of nickel.

alkaline cleaner. The ware coming from the emulsion cleaners showed water and acid breaks in all stages of the test before final alkaline cleaning.

When should a cleaner be discarded?

A method of accurately determining when the useful life of a cleaner tank is completed is another test badly needed to insure good cleaning at all times. We can tell when the cleaner tank is not cleaning properly by the trouble resulting in the enameling process; but we should know before rejects, due to poor cleaning, begin to show up. This would also result in lower cleaner costs as we would not be discarding the cleaner arbitrarily in an attempt to prevent trouble we think may occur in the near future. Can the activity check be used here as a measure of alkaline cleaner life? Is there any method of determining when an emulsion cleaner has served its maximum useful life?

In applying white enamel directly to steel, uniform acid etching, uniform nickel deposit, and the absence of metallic soaps and salts are required. This is of much greater importance here than when conventional ground coat is used; here the cleaners

play an important part to produce a surface which will permit uniformity in the pickling cycle.

Cleanliness affects nickel deposit

We have found that the degree of cleanliness affects the acid etch and nickel deposit. As a uniform nickel deposit is needed to successfully run white enamel direct to steel, we are changing our method of nickel de-

termination in order to be able to check this deposit more easily.

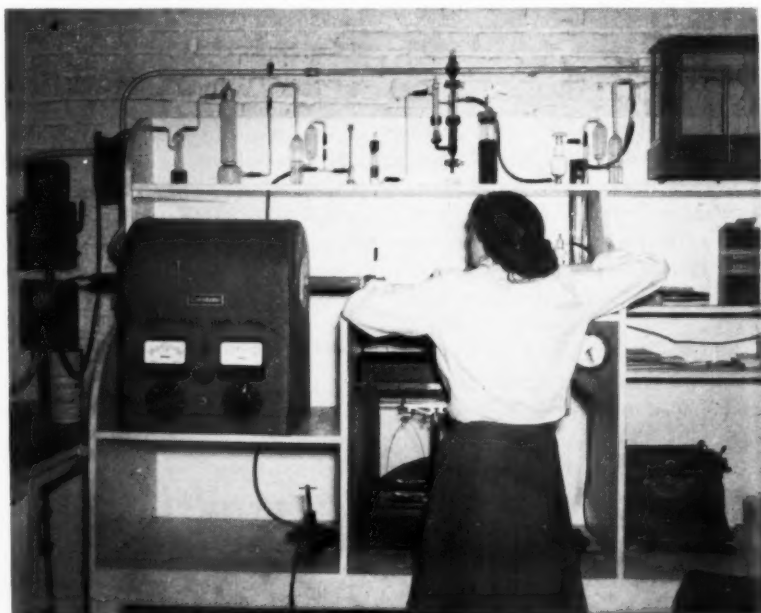
Method of nickel determination

This is done by using a rubber ring having a hole with an area of 0.01 square feet. The ring has a wall thickness of $\frac{3}{8}$ inch and is about 1 inch high. It is placed on a pickled part in the area that we wish to check the deposit; an iron ring, weighing about 5 pounds with a cone shaped hole to fit over the opening in the rubber ring, is placed on top of the ring to hold it firmly to the surface of the metal. 50% nitric acid is poured into the ring to dissolve the nickel and then is sucked out into a flask. The surface is then rinsed with hydrochloric acid and water and these washings are also added to the flask. Ammonium hydroxide, ammonium persulfate, and sodium salt of dimethylglyoxime are added to the flask. This solution is checked in a photometer, and the amount of nickel deposit determined. This reading multiplied by 100 gives the deposit per square foot.*

We have found that the nickel deposit will vary greatly at different locations on the same part as well as varying with the type of metal used. Is this lack of uniformity due to the

to Page 76 →

Photo shows a section of the ceramic laboratory at the Roper plant.



A COMBINATION THAT IS HARD TO BEAT

Cowles **KW and SK**

All subsequent cleaning operations are reduced to a minimum by using KW alkaline cleaner and SK emulsion type cleaner together in the pre-soak operation. These two fast acting, efficient and economical cleaners do a real job of removing oils and stubborn soil when used in combination.

KW Cleaner alone will handle all cleaning operations after the soak cleaning. It can be used in still tanks—with or without electric current—and in all standard washing machines.

**COWLES
TECHNICAL
SERVICE
ON REQUEST**



PROMPT SHIPMENTS FROM LOCAL STOCKS

Cowles Chemical Company

METAL CLEANER DEPARTMENT

CLEVELAND 3, OHIO



The Finish Winner

*I*ndependent laboratory tests have proved that Porcelain Enamel is the most practical, abuse-resisting finish for any cabinet or appliance top.

Porcelain Enamel tops have been put through countless rigid endurance tests against heat, acids, scratching and cold. They were always rated the most durable.

Ordinary home use means abuse almost as great as that of the laboratory. When a housewife finds the beautiful new ironer, washer, dryer, cabinet or table top hopelessly scarred after only a short period of use, it is extremely doubtful that she would have glowing praise for the product. Your switching to porcelain enamel will change

this attitude to one of happy satisfaction. Result: repeat orders.

In addition to this, Porcelain Enamel is one of the most economical finishes you can use. We have recently developed die equipment which can produce practically any size top with $1\frac{1}{2}$ inch or $\frac{5}{8}$ inch radius. It is highly possible that our wide range of work top sizes will save you the expense of forming special dies.

Check with us about an economical use of the most durable finish . . . Porcelain Enamel, of course!

*Plan...
for the Lifetime
Finish*

VITREOUS STEEL PRODUCTS INC.

BOX 1791, CLEVELAND 5, OHIO (Factory at Nappanee, Ind.)

NEWS

REMA TO SPONSOR EDUCATIONAL CONFERENCES

Three and possibly four educational conferences and exhibits will be sponsored by the Refrigeration Equipment Manufacturers Association during 1950 and 1951, it was announced by F. G. Coggin, chairman of REMA's Education Committee. These educational conferences will follow the same general pattern as the four regional conferences held during the past two years in San Francisco, Boston, Chicago, and Birmingham, Alabama. Announcement of location and dates will be made in the near future, it was stated.

DEVILBISS SCHOOL ANNOUNCES SPRAY FINISHING CURRICULUM

Five intensive one-week courses for industrial finishers are included in the DeVilbiss School of Spray Finishing curriculum for the first half of 1950. Maintained as a service to all users of DeVilbiss equipment, the tuition-free courses include comprehensive instruction on all spray finishing techniques and the function and care of spray equipment.

Classes lasting one week each will begin on January 23, March 27, April 17, May 8, and June 19, with all courses covering the same subject matter. For further information and application blanks, write to the company for Forms F-224 and INS-753-A. Since class size is limited, it is advisable to write for reservations as early as possible to The DeVilbiss finish JANUARY • 1950

Company, 300 Phillips Avenue, Toledo 1, Ohio.

ROE HEADS TRACY SALES

B. T. Roe has been appointed vice president in charge of sales for Tracy



Manufacturing Co., Pittsburgh, announced Charles Wiener, president of the firm which manufactures kitchen cabinets and cabinet sinks.

Roe assumed his duties after resigning as vice president and general manager of J. N. Ceazan Co. Prior to his West Coast connection, he was director of distribution for the Crosley Division of Avco Manufacturing Corp. He started his career in the appliance business with Nash-Kelvinator as a district manager.

WEBER TO SOUTHERN EXPRESS

Southern Express Company has announced the appointment of M. F.

Weber as vice president in charge of sales and traffic. Weber had been associated with American Stove Company, Harvey, Ill., for the past 25 years, the last 12 years as traffic manager.

Mr. Weber, who is also chairman of the Loading Research Division of the National Safe Transit Program, will have his headquarters in Chicago, with an additional office in Warren, Ohio.

AHLMA ANNOUNCES

CALENDAR OF 1950 EVENTS

The American Home Laundry Manufacturers Association has announced its 1950 calendar of industry events as follows: Fourth National Home Laundering Conference, Chicago, January 10-11; Association annual meeting and election of officers, Chicago, January 12; National Home Laundry Week, June 5-12; Association annual summer meeting, executive committee, July 11, general membership, July 12-14, both at Chalfonte-Haddon Hall, Atlantic City.

HOOD ELECTED PRESIDENT

OF CARNEGIE-ILLINOIS

Clifford F. Hood, until recently president of American Steel & Wire Co., a U.S. Steel subsidiary, has been elected president of Carnegie-Illinois Steel Corporation, another U.S. Steel subsidiary, according to an announcement by Benjamin F. Fairless, U.S. Steel president.

The election followed the resignation of Charles R. Cox, president of Carnegie-Illinois since August 1, 1946, who assumed the presidency of Kennecott Copper Corporation, New York, N.Y., on January 1.

LODESTRO JOINS

MANCHESTER PORCELAIN

Announcement comes to finish that Leonard Lodestro has joined the organization of Manchester Porcelain Enamel Corporation, Manchester, N. Y., as ceramic engineer.

Lodestro has been connected with

the porcelain enameling industry for a number of years including positions at Crown Stove Company, Cribben & Sexton Company, and Lawndale Enameling Co. — all of Chicago, Ill.

Manchester Porcelain does job enameling work of all types and is under the direction of Dr. Paul A. Huppert, formerly of Lisk Manufacturing Company, of Canandaigua, N. Y.

and Tom Zeder, Briggs public relations executive, are shown with the visitor.

Mr. Ryu is making a nationwide inspection of manufacturing facilities and methods in the United States. He is a graduate of Washenda University and an ex-college professor in Japan. He was reported to be most impressed by the huge presses used to form the steel stampings for the bathtubs.

KOREAN REPRESENTATIVE TOURS AMERICAN PLANTS



Han Fang Ryu (extreme right on photo), chief of Bureau of Industries and minister of Commerce and Industries of Seoul, Korea, is shown examining a Briggs lavatory after touring

the plumbing ware factories of Briggs Manufacturing Co., Detroit.

Joseph Cheek, field representative of the Bureau of Apprenticeship of the U.S. Department of Labor (left),

BINKS ESTABLISHES FINISHING METHODS RESEARCH DEPT.

A new Finishing Methods Research Department, equipped to run comprehensive tests on actual products, using the latest standard automatic and manual spray finishing equipment, has been established by Binks Manufacturing Company, Chicago.

According to Burke B. Roche, Binks president, the new department will devote its full time to helping manufacturers reduce finishing costs and improve quality. Without obligation to manufacturers, Binks will determine whether or not products can be finished automatically, it was stated.

WEAVER AWARD PRESENTED TO FOUR FERRO EMPLOYEES

R. A. Weaver, chairman of the board, Ferro Enamel Corporation, presented the annual Weaver Award certificate and a check for a cash prize to four Ferro employees recently. Awards were adjudged on the basis of outstanding contributions in

1949 to Ferro Enamel Corporation and to the porcelain enameling industry for technological developments; establishment of efficient cost reducing administrative procedures along with the development of a portable miniature porcelain enameling plant

that helped to interpret the porcelain enamel production procedure for the layman.

Those receiving the award certificates and checks were: G. W. Hofstetter, midwest division; Donald R. Goetchius, assistant director of porcelain enamel development; R. F. Duncan, manager of color division; and Dr. M. J. Bahnsen, director of chemical research.

DUNCAN



GOETCHIUS



BAHNSEN



HOFSTETTER



NEW SAFETY RECORD

A new first in safety was established recently at South Works of Carnegie-Illinois Steel Corporation, a U.S. Steel subsidiary, when the plant's

maintenance division employing nearly 2500 men worked two million man-hours without a lost-time accident for the second time in the past 12 months.

PEMCO EMPLOYEES HONORED AT SERVICE DINNER



Ninety members and guests of the Pemco Honor Service Society met recently in Baltimore for their 12th annual dinner to pay tribute to employees who have been with Pemco Corporation ten or more continuous years. Sixty-three members of the Society, representing 1200 years of service, were present.

Herbert Turk, executive vice president, presided as master of ceremonies. Following the dinner, Richard H. Turk, president, gave the welcoming address. Then Thomas D'Alesandro, mayor of Baltimore, pointed Baltimore progress within the past 40 years and emphasized the important part played by the members of the Society in this progress.

A gold engraved watch was presented to Edward Gronberg upon completion of 25 years with the company. Twenty-year service awards were presented to P. J. Lubertine and J. H. Steigerwald. S. T. Palsa, G. H. Spencer-Strong, and G. H. Weinbeck received fifteen-year service awards, and a ten-year service award was presented to M. Pearman.

Karl Turk, Sr., founder, past president, and now chairman of the board, was honored by a special play featuring the company's growth.

dent, and now chairman of the board, was honored by a special play featuring the company's growth.

ROPER EXECUTIVES EXAMINE SAFE TRANSIT CERTIFICATE

Left to right in photo, Lionel R. Jensen, works manager, Stanley Hobson, president, E. Carl Sorby, vice president, and E. H. Shands, director

LP-GAS TRADE SHOW IN MAY

The annual convention and trade show of the Liquefied Petroleum Gas Association will be held at the Palmer House, Chicago, May 8 through 11, according to an announcement by Arthur C. Kreutzer, new LPGA managing director.

The program is being set up to give exhibitors equal and favorable time, and space will be assigned on a first come, first served basis, taking into account the manufacturers preferences, it was stated.

WASHER, IRONER SALES CONTINUE AT HIGH LEVEL

Reflecting the start of the steel strike's effect on production, October factory sales of 333,728 standard-size household washers nevertheless came within 6.6 per cent of equalling the year's high of 357,281 units achieved in September, according to industry-wide figures announced by the American Home Laundry Manufacturers Association.

Ironers sold in October aggregated 36,045 units, or 30 per cent above 27,700 in September, reported the Association.

of research and development, examine the certificate awarded Geo. D. Roper Corporation by the National Safe Transit Committee for meeting pre-



shipment test requirements on the company's crated products.

Companies receiving the certificates are entitled to use the Safe Transit stickers on approved packages. Not only does the sticker merit the respect of shipping concerns who have severe losses due to damaged-in-transit goods, but it means that retailers are assured that manufacturers using the stickers are doing everything possible to see that their products arrive in top condition.

FIRST UNITED STATES

INTERNATIONAL TRADE FAIR

Prominent national leaders in the steel industry are participating in the First United States International Trade Fair, a giant trade show patterned after the world-famous Leipzig and Antwerp fairs, which will be held in Chicago, August 7 to 19, 1950.

Among the nation's leaders participating as members of the advisory or executive committee staffs are

C. B. Randall, president of Inland Steel Company, and E. D. Graff, president of J. T. Ryerson & Son, Inc.

One million square feet of Chicago's largest exhibition halls will house the Fair, which will be one of the most tremendous trade exhibitions ever held in the Western Hemisphere.

Fair officials report that buyers and exhibitors from all over the world are already writing for reservations.

GENERAL BOX ANNOUNCES

ELECTION OF DIRECTORS

General Box Company, Chicago, has just announced three changes in their board of directors.

E. E. Ames, of Crawfordsville, Indiana, was elected chairman of the



E. E. AMES

board. Ames is a veteran of General Box, having aided in the foundation of the company in 1922 and then, prior to his retirement in 1947, serving as vice president and director of sales. His entire business career has been devoted to the wooden box business. Immediately after graduating from college he started as a bookkeeper in a box company and worked up to president of his own company.

Two new directors were also added to the General Box directorate. W. C. Embry, vice president in charge of the Louisville plant, was elected a director to fill the position held by his father, the late Harry W. Embry. J. F. Ferguson, vice president and sales manager, was advanced to director. Both Embry and Ferguson will retain their old duties in addition

ALWAYS

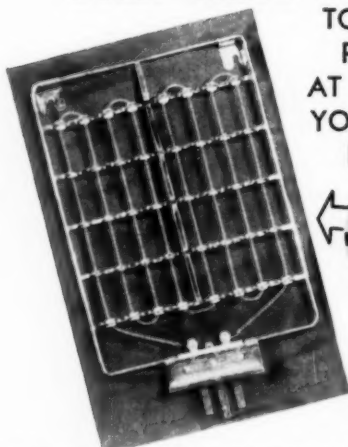
AHEAD OF THE PARADE

WITH

1. SUPERIOR DESIGN
2. QUALITY
3. CAPACITY TO PRODUCE
4. SERVICE TO CUSTOMERS
5. LOWER PRICES

OVEN UNITS

DESIGNED
TO YOUR
RANGE
AT A PRICE
YOU CAN'T
RESIST



- 3, 5 and 7-HEAT SWITCHES
- TERMINAL BLOCKS

SELECTORS
CONTROLS
HI-LOW GAS
VALVES



Increase profits by using our 25 years of practical experience in range design and manufacturing. Identify your ranges with these products that have proved consumer acceptance. Over 30 range manufacturers use our products. Join the parade now. Phone, write or wire for one of our field engineers to call at your convenience.

FERRO ENAMEL SUPPLY CO.

KIRKLAND, ILL.

tion to their new responsibilities, it was stated.

GULF OIL ADVANCES GODDARD

Homer A. Goddard, Jr. has been named assistant general manager for



industrial marketing for Gulf Oil Corporation, according to an announcement by H. G. Meador, vice president of divisional sales.

In his new post, created as part of the firm's reorganized domestic marketing program, Goddard will be responsible for direct sales of Gulf products to industrial plants and organizations.

After receiving his education at Ohio University and at Colorado School of Mines, from which he was graduated in 1925, Goddard worked several years in the operating end of the brick and coal mining industries. He later served with Bethlehem Steel Corporation and with Mine Safety Appliances Co. in industrial sales. He joined Gulf in 1932.

ALLEGHENY LUDLUM ANNOUNCES TOP STAFF CHANGES

Top executive staff changes announced recently by Allegheny Ludlum Steel Corporation included the election of H. G. Batcheller, company president, as chairman of the board, with E. B. Cleborne, executive vice president, succeeding to the office of president.

finish JANUARY • 1950

LINCOLN BRASS APPOINTMENT

Ervin H. Mueller, president of Lincoln Brass Works, Detroit, has announced that Donald E. DuPerow has been elected to the office of vice president.

DuPerow has been associated with the company for the past eleven years, originally as chief engineer, and in recent years as plant superintendent. Prior to his association with Lincoln Brass, he was employed as an engi-

neer by the American Gas Association Testing Laboratories in Cleveland.

AGA TESTING LABORATORIES

ADOPT NEW NAME

Effective January 1, the name of the American Gas Association Testing Laboratories was changed to American Gas Association Laboratories, in accordance with action taken at a recent meeting of the AGA executive board. The abridged name

FRANTZ FERROFILTER ... (Reg. U. S. Pat. Off.) for CLEAN finishes

Buying Frantz FerroFilter is like buying "finish insurance" — insurance against black specks or other defects resulting from iron contamination.

Porcelain enameled products for the kitchen, bath, and laundry — or any modern porcelain enameled products — must present a glistening, defect-free finish to pass inspection on the sales floor today.

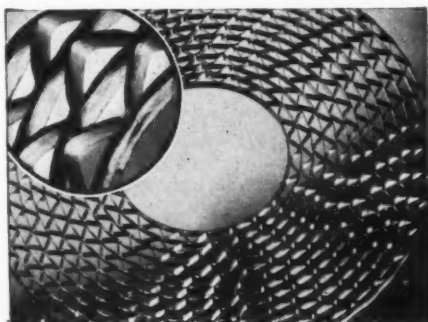
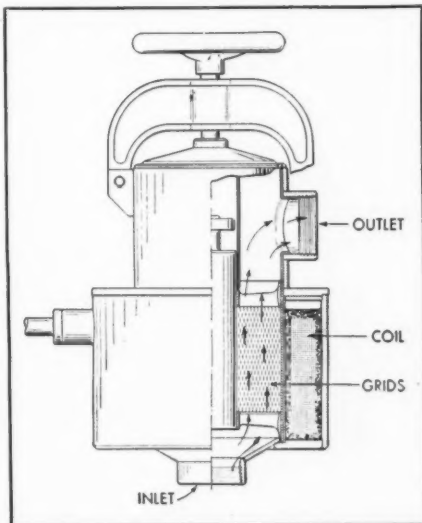
Every important forward step in developing whiter enamels and thinner coatings emphasizes the importance of proper cleaning.

There is one SURE way to assure that enamel slips are free of iron contamination — install FerroFilters at important handling points for the liquid enamel.

Wet FerroFilters
Gravity-Pipeline-Underfeed
Dry FerroFilters

For dry process enamels and other ceramic materials

Electromagnetic FerroFilters use from 16 to 30 of these patented grids in each unit, representing hundreds of feet of sharp, magnetized "collecting" edges.



Authorized Representatives for the Enameling Industry

Chicago Vitreous Enamel Product Co., 1325 So. 55th Court, Cicero 50, Ill.
Ferro Enamel Corporation, 4150 East 56th Street, Cleveland 5, Ohio

S. G. FRANTZ CO., INC.
161 GRAND STREET, NEW YORK 13, N. Y.

is believed to be less restrictive in its description of the function of the Laboratories.

SIGN MEN TO MEET

IN CINCINNATI, FEB. 6-8

The 4th annual convention of the National Electric Sign Association will be held in Cincinnati, at the Netherland Plaza Hotel, February 6, 7 and 8. There will be 66 exhibit booths displaying the latest developments in materials and equipment

used in the electric sign industry.

WINTER HOMEFURNISHINGS MARKET IN CHICAGO, JAN. 9-20

The International Homefurnishings Winter Market, held in Chicago at the American Furniture Mart and The Merchandise Mart, will open January 9 and will close January 20.

At a press conference at The Merchandise Mart, January 11, the following men will discuss trends in the appliances, housewares, radio and

television markets: Dr. W. R. G. Baker, vice president, Electronics Division, General Electric Co.; J. W. Alsdorf, president, Cory Corp., and president, National Housewares Manufacturers Association; and W. A. Blees, vice president and general sales manager, Crosley Division, Avco Manufacturing Corp.

TEXLITE REPRESENTATIVE

J. C. Curington has been appointed resident district representative for



Texlite, Inc. in Oklahoma, Arkansas, Kansas, and Missouri, according to H. H. Wineburgh, Texlite president.

Texlite recently opened new offices at 834 So. Louisville, Tulsa, Okla. Associated with Texlite since October, 1940, Curington was promoted to production manager during the war and served in that capacity until his recent appointment.

ACORN-ORIOLE APPOINTMENT

W. S. Hartman, for 30 years an employee of Perfection Stove Company, has been named assistant sales manager of its new Acorn-Oriole division. Announcement of the appointment was made by H. C. Erhard, Acorn-Oriole sales manager.

Perfection acquired the Acorn-Oriole domestic range assets from Standard Gas Equipment Corp. some months ago.

ARMCO JOINS ORE PROJECT

Armco Steel Corp. is one of five firms helping to finance a \$200,000-

New Robertshaw 3 in 1 Control FOR ELECTRIC RANGE OVENS



A TURN OF THE DIAL

AUTOMATICALLY

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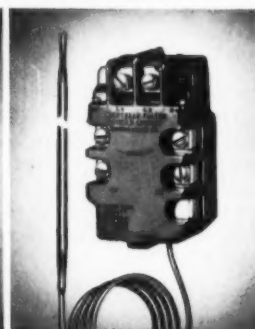
Cuts in two oven elements for quick preheating



AUTOMATICALLY

2

Cuts out top element shortly before oven reaches preheat temperature minimizing overshoot



AUTOMATICALLY

3

Cuts in lower element and maintains oven temperature on that circuit only

A new high degree of automatic control of oven temperature is made possible by the new complete line of Robertshaw Electric Thermostats. The model illustrated combines the thermostat with automatic switching mechanism in a compact, easy-to-install case. Four mounting positions are provided, together with close-up or extended bezel to fit any switch panel in range-top or mantel-back position.

All operating parts have been reduced in size, and terminal screws are recessed to save space. Screws are inserted from rear, increasing accessibility and simplifying installation.

Complete line consists of three basic models. Write for complete information.



In home and industry, EVERYTHING'S UNDER CONTROL

Robertshaw

THERMOSTAT DIVISION

ROBERTSHAW-FULTON CONTROLS COMPANY

YOUNGWOOD, PENNSYLVANIA

000 iron ore development project in Labrador, it is reported.

TO REPRESENT FEDERAL MACHINE

The Federal Machine and Welder Company, Warren, Ohio, has an-



nounced the appointment of Harlan W. Burbank as district representative for southern Ohio, western part of West Virginia, and Kentucky, with offices in Cincinnati.

Burbank is a member of the Society of Military Engineers and worked for two and one-half years in the Atomic Laboratories, at Los Alamos, New Mexico.

COWLES METAL CLEANER CLINIC

"New Products for Better Cleaning" was the theme of a recent sales clinic conducted by Cowles Chemical Company in Cleveland, Ohio, where several new products were introduced to the Cowles technical men who attended the three-day meeting at the firm's home office.

LAND ACQUIRED FOR EASTERN SEABOARD STEEL MILL

Carnegie-Illinois Steel Corporation has announced that it is acquiring a 3800-acre tract of land, located on the Delaware River, in Falls Township, Pennsylvania, about 30 miles northeast of Philadelphia, for possible future use as a site of an eastern seaboard steel mill. The building of

finish JANUARY • 1950

such a mill, however, has not yet been authorized, it was stated.

DEEFPREEZE PLANS FULL LINE OF APPLIANCES FOR 1950

The Deepfreeze Division of Motor Products Corp. has announced that it will market a full line of major home appliances for the kitchen in 1950.

The company will add new re-

frigerator, electric range and water heater lines, and will expand the Deepfreeze line to six models, it was stated.

KELLNER ON TRADE FORUM

Albert Kellner, export manager for Pemco Corporation, was reelected a director of the Baltimore Foreign Trade Forum the second consecutive year.



sell UP with FIBERGLAS* INSULATION

Selling your higher quality appliances demands *extra* selling features—like Fiberglas Insulation, one of the important plusses in modern appliances.

Here's an advantage that millions of housewives read about in such magazines as *Life* and *Good Housekeeping*. And many more see dramatic demonstrations in stores and schools showing greater values they get from Fiberglas Insulation.

So cash in on this promotion. Sell up—and up your profits with Fiberglas Insulation. For FREE demonstration and merchandising materials, write to Owens-Corning Fiberglas Corporation, Dept. 109-A, Toledo 1, Ohio.

*Fiberglas is the trade-mark (Reg. U. S. Pat. Off.) of Owens-Corning Fiberglas Corporation for a variety of products made of or with glass fibers.



FIBERGLAS IS IN YOUR LIFE... FOR GOOD!

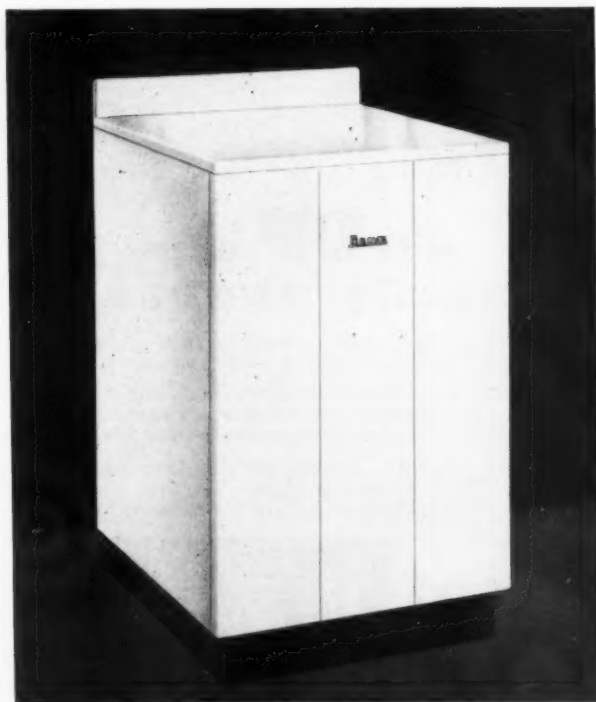


This sink combination, made by Thor Corporation, is a three-in-one work and space saver. The streamlined appliance acts as a dishwasher, clothes washer, and sink. Its use in home building eliminates allocating plumbing and space for conventional laundry tubs and washing machine.

BROWN STOVE INTRODUCES A NEW HOT WATER HEATER

Brown Stove Works, Inc., Cleveland, Tenn., is now producing this

water heater is said to surpass NEMA minimum heating element standards



all-porcelain enamel 30-gallon table top hot water heater. The electric

by 60 per cent. The back splash may be removed if desired.

Appointment of Joseph B. Dietz as manager of the industrial sales section of the finishes division of Du Pont Company, was announced recently.

1900 CORP. TO SPEND HALF MILLION TO BOOST PRODUCTION

A \$650,000 improvement program was announced in late December by Nineteen Hundred Corporation, St. Joseph, Michigan, manufacturers of home laundry equipment.

Elisha Gray, president, said the project will give the firm increased and more efficient production, and will provide improved working conditions for the firm's employees.

EARL HEADS ACME ALUMINUM FOUNDRY



Oliver L. Earl has been elected president of Acme Aluminum Foundry Co., Chicago, to fill the vacancy caused by the death of Harry L. Ferguson early in 1949, according to a company announcement. Earl, who joined the company as vice president and director, will be succeeded in those offices by Harold Osborne, who retains his post as secretary-treasurer. The firm produces aluminum and manganese castings for 42 fields of industry.

Earl is chairman of the Associates Division of the American Home Laundry Manufacturers Association, comprising 70 leading suppliers to that industry.



*Y*EARS AGO we learned how to build welded-wire steel shelving in a way to solve the other fellow's production headaches. It's only a matter of putting the pieces together — but, oh, what a difference our *know-how* can make in the finished result!

Long service to our customers have enabled us to equip our plant with the most modern production facilities — automatic assembly-line fabrication and welding, complete in-plant finishing by dip or plating. Most important of all, our engineering service *anticipates* production problems and requirements, then *pre-engineers* their solution.

**YOU CAN PUT YOUR TROUBLES ON THE SHELF
WHEN UNION STEEL IS YOUR CONTRACT PRODUCER.
SHELVING SPACE IS SELLING SPACE. LET US
HELP YOU MAKE THE MOST OF IT!**



UNION STEEL PRODUCTS COMPANY

Wire Division • ALBION, MICHIGAN



Ray Shank, Milburn Dick, E. W. Nagel, of Wrought Iron Range; J. L. Gabris, R-F; Dominick Saponara, Floyd-Wells; F. H. Post, G. P. Grace, W. F. Cathcart, Robertshaw-Fulton.

E. D. Hillebrand, Florence Stove Company; and W. A. Beck, Nubian Division of The Glidden Co.



E. J. O'Connell and W. C. Johnson, of Verson Allsteel Press Co.; and Nathan R. Klein, Caloric Stove Corp.



B. W. Hines, Ferro Enamel Supply, R. E. Fetzer, Sears-Roebuck; Wm. Robinson and N. M. Ramler, of Ramler & Robinson; H. F. Bond, T & K; and D. V. Tuttle, Ferro Enamel Supply.

C. S. Anderson, New Monarch Machine; A. H. Crone, Roper Corp.; R. S. Penn, Penn Electric Switch.



The Hart Manufacturing Company furnished the stove men with pipes and specially blended tobacco.



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finishfotos



L. L. Frost, Jr., of Owens-Corning Fiberglas; T. J. Cerny, Sears-Roebuck; L. S. Richardson, Newark Stove Co., and Harry D. Warnke, of Owens-Corning Fiberglas Corp.



Harry Carroll, Estate Heatrola; G. F. Sindelar, Tinnerman Products; William Buttriss, Tinnerman Products; and Ellsworth Simms, Estate Heatrola Division of Noma Electric Corp.

J. W. Campbell, Estate Heatrola Division; F. W. Stuart, Chicago Mill and Lumber Co.

Wm. Wildern, Detroit Brass & Malleable, D. S. Hutchins, Andes Range; Bob Guy and Joe Gabry, Detroit Brass.

PHOTOS

finishfotos



K. B. Smith, Norge; Roy Stone and W. A. Weymouth, of National Lock Company; and R. F. Hornbach, of Norge.



Lloyd Lea, S. Jolman, Winters & Crampton; A. M. Snider, I. B. Trussler, Canada; Jim Vader, Norman Jervis, Winters & Crampton.



ATTENTION!

You Enamelers Who Want More Profitable Operation



What do you need for more profitable operation? Greater uniformity in the frits, powdered clays, and oxides you buy? Increased production? Better coverage? Better color match? Fewer rejects? Lowered costs all around?

Just name what you need for boosting profits of operation and we'll fill that need. Promptly!

We speak with the assurance that comes from 57 years of specialized experience. The forward-looking house of Hommel is one of the oldest and most honored in the industry.

Our organization rubs elbows regularly with 5,000 satisfied users of our products.

Request a Hommel Service Engineer. That will be the beginning of more profitable operation for you.

Laboratory Controlled Production of Ceramic Supplies

- FRIT for Steel, Cast Iron or Pottery
- CERAMIC COLORS
- CHEMICALS
- BRONZE POWDERS
- METAL POWDERS
- SUPPLIES
- EQUIPMENT

Our Technical Staff and Samples are available to you without obligation. Let us help you with your problems.

World's Most Complete Ceramic Supplier



Seventeenth annual meeting of cooking and heating appliance manufacturers

(Continued from Page 21)

ser, "I am sure that the Nineteenth Century would be designated as the *era of the inventors*. . . . With the dawn of the Twentieth Century began the *era of production genius*. It was through the talents of these men that the inventions of the Nineteenth Century were put into mass production, thereby bringing prices down so that almost anyone could enjoy the conveniences and the other things which we today expect as commonplace and as necessities. . . .

Entering era of the salesman

"Now we are entering a new era in the economic history of this country, and I am sure that the second half of the Twentieth Century will be known as the *era of the Salesman*. The problem confronting all of us today is that of keeping our sales volume in step with our great capacity to produce. If we are to enjoy the prosperity we have known for the past four or five years, it will have to be done through the selling effort and the sales departments of every organization. The manufacturer must intensify his selling effort and so must the dealer and the retailer, so that more and more goods will continue to flow from our factories. . . .

"Companies today spend thousands of dollars in the design of products, more thousands in the engineering of products, still more thousands for the tools to produce such products in quantity at the lowest possible cost, and more thousands of dollars advertising the product. The fate of all these thousands of dollars, adding up into millions of dollars, is in the hands of the individual salesman. That fellow who finally gets the order. It is only natural, therefore, that business management should direct its attention to the work of this salesman, and to what can be done to increase his efficiency and decrease the selling cost."

Mr. Kaiser then gave the following definition of a sale: "A Sale is a transaction between two or more human beings." Continuing, he added "As such it is subject to all the actions

and reactions and emotional experiences of any transaction between humans. Subject to all the joys, fears, hopes, likes, dislikes, and sorrow. With that definition in mind, it is easily understood that salesmanship covers a much wider scope than mere selling.

"Salesmanship is the art of selling, whereas selling itself may be termed the act of getting the order. . . . Salesmanship creates a favorable climate in which the salesman can operate most efficiently. . . . The telephone operator creates a favorable or unfavorable impression by the way she performs her duties. . . . The receptionist represents your company for the time a customer waits in her office. . . . The cashier, the bookkeeper, the credit and collection manager, the purchasing agent, all of them and more are actively engaged all of the time in the art of salesmanship.

"Since the turn of the century, management has focused its attention on greater efficiency and lower cost in its production departments. Time has come when the attention must be focused on its distributing departments so that greater efficiency and lower costs per unit can be obtained. Salesmen, today, must be trained to do their job more effectively and efficiently and the organization behind the salesmen must be trained to do its job without placing additional burden upon the individual salesman."

The fact that 70% of the men engaged in selling today haven't sold in a competitive market was stressed by Mr. Kaiser who stated that the salesmen today "need training and need it badly. And it is most important that the manufacturer make available to the retail salesman and dealer a complete training service on the products made by the manufacturer. . . . In studies conducted by a number of organizations, it was discovered that salesmen have their greatest problem in planning their day's work. . . . The only time a salesman can get an order is when he is standing in the presence of a

customer. . . . He must show the customer, demonstrate the product to him, and not try to sell from a catalog."

Mr. Kaiser also warned the manufacturers to "make sure your salesmen don't have to sell certain departments of your organization. They should be selling merchandise." The speaker was referring to certain departments which handled customers in such a way that they became "sour" on the company as a whole.

The age of selling

"This is the age of selling. Now as never before must we direct all of our attention toward this job of selling merchandise and it is going to take the best thinking of the salesman, the dealer, and the manufacturer to develop sales programs which will move larger quantities of merchandise at lower distribution costs. The only time a profit is made is when a sale is made. The size of your inventory will not determine your profits, but the turn-over of your inventory will. Salesmen must sell and the organization behind the salesmen must create the climate in which each salesman can do his job effectively and efficiently," stated Kaiser at the end of his talk which climaxed what was considered one of the best general session programs in recent years.

Stove men discuss business problems at management forum

Tuesday afternoon was given over to the Management Forum at which well-known stove men discussed business problems of a hypothetical company working to get its share of today's markets, with Cecil M. Dunn, vice president, Estate Heatrola Division, Noma Electric Corporation, as moderator.

Executives of the hypothetical firm were: Top Management Official, A. B. Ritzenthaler, vice president, The Tappan Stove Co.; Sales Manager, H. L. Clary, director of sales, Norge Division, Borg-Warner Corp.; Factory Manager, Hugo E. Kenitz, Globe American Corp.; Financial Executive, Sidney R. Hill, controller, Cribben & Sexton Co.; and Labor Relations Official, J. B. Tudhope, director of indus-

trial relations, Florence Stove Co.

Revitalizing sales programs

H. L. Clary, director of sales for Norge, presided at a lively session for sales, advertising, and marketing research officials on Wednesday afternoon.

Guest speaker was I. B. Bricker, manager of Gimbel's major appliance department in Pittsburgh, whose topic was "Revitalizing Selling Programs for 1950."

"The average retail salesman is so worried over his financial troubles that he can't sell . . . take his financial worries from him so that he will spend his time worrying about your business," Bricker told his audience, adding that in order to accomplish this, companies should either pay salesmen a salary plus a commission — or — a draw against his commission.

The speaker also urged that retail salesmen be both trained and directed in the art of selling. He emphasized the fact that many sales are lost be-

cause too much stress is put on "price" and not enough on what the product will do for the customer. Quality and service should always be fully explained before price is brought into the sales picture, said Bricker.

Too many models and too many dealers!

"Manufacturers should concentrate more on fewer models because salesmen can't learn everything about each model and consequently can't give a complete sales talk on each line. . . . There are also too many dealers. . . . With fewer dealers, a better training job can be done. Moreover, with fewer dealers, there will be less 'discounts needed to sell' because the customers will have fewer dealers to bargain with," said Bricker.

Retail dealers should have only one good price leader, and they should have only three price classes — low, medium and high — with only one or two models in each class, concluded Bricker.

Deep drawing of rectangular and round shells

(Continued from Page 24)

is determined by the metal analysis, temper, and the time between operations. Sometimes you are forced to anneal. The first step is to remove the lubricant so it will not carbonize. Then the annealing can be done by open burners, furnaces, or ovens.

Aluminum is very easy to anneal since it forms a tight oxide that does not have to be removed. But you have to be very careful not to enhance grain growth. With carbon steel and stainless steel, you have a greater problem. You have to pickle the oxide off before the next draw, make doubly certain that no grit is present, and re-lubricate the part.

It is always a problem to keep the side walls of any rectangular or square shape from becoming concave. Likewise, they all tend to swell out to a round because of strains. This can only be minimized by absorbing the extra metal by embossings, or by annealing and stretching.

Elimination of draw marks

Another problem in this type of

work is the elimination of draw marks or dents caused by gauling, scoring, or the impinging of foreign substances. Obviously, the answer to draw marks is to choose the right die materials, provide the right radii on all draw corners, and to polish these surfaces very smooth. Dents caused by foreign substances are best controlled by eliminating the cause.

Cleanliness is next to godliness in draw work, and everywhere along the line, dirt, grit, etc. must be eliminated. I have seen relatively soft foreign matter, like pieces of bristles from lubricant brushes, imbed in aluminum. In order to get high quality aluminum parts, there must be eternal care on all operations. The sheets and blanks must not be slipped on one another or the burr will scratch the sheet next to it. Sheets, blanks, and shapes must be protected from dirt and grit. The drawing oil or compound must be filtered if possible.

All working surfaces of tables or conveyors must be clean and padded.

The operators must not throw the parts. They must place them gently in suitable clean tote boxes or trucks. Whenever there are multiple finishing operations on a shell, we try to run two or three dies in a press at one time to eliminate handling and damage.

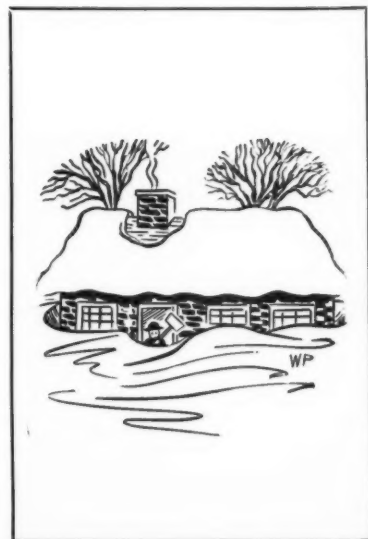
With steel of medium to heavy gages, it is entirely practical to "draw off the ring", or to produce a shell with no flange. You can't do this under certain conditions with a multiple draw job from aluminum or other relatively soft and thin metals. The weight of the press blank holder plus the die is so great, and the metal is so weak, that as the edge of the shell goes over the radii of the draw ring, the unit load will concentrate and cause the shell to "ear" and thin out. These tabs, or ears, eventually break off in the form of slivers which stick to the shell or die. If they are not removed before the next draw, they will imbed in the metal.

This reduces the cross-sectional area, and you will have localized stretching which, after a few more reductions, looks a lot like laminations and frequently causes the metal to fracture.

Drawing compounds are critical

Drawing compounds for aluminum are critical since this metal etches easily. We have found water-bearing compounds, if allowed to remain on the work, not satisfactory. Many of

to Page 73 →



→ from Page 70

the oil-bearing compounds are good, but they must be chosen as determined by the severity of the draw. They range all the way from light engine oil to a 75/25 mixture of paraffin and tallow applied in stick form.

We require a compound that will stick with the work through at least four draws, can be removed in a trichlorethylene degreaser, and, after annealing, not leave a carbonaceous film that would hinder the alkali etching process. We have standardized on a paste-type compound applied by a power roller.

Whatever compound is used, it must be applied evenly and consist-

ently. Variations in lubrication can run the breakers way up.

For die materials, we have used Tensiloy, Meehanite, Tool Steel, etc., but our people like Strenes C the best. This is a fine grain, graphitic, heat-treatable cast iron. We use this for the blank holder nose, and as a facing for the draw rings only. While the material is soft, or in the "as cast" condition, the dies are worked in and a limited run is made; then the dies are hardened to about 58 Rockwell C. After this, they are refitted and polished.

Adapted for *finish* from a paper presented before the annual meeting of the Pressed Metal Institute.

The hot spray process for organic finishes

(Continued from Page 27)

material passes through the heater the viscosity is still further reduced, and atomizing air pressures can be lowered generally to $\frac{1}{2}$ or $\frac{1}{3}$ of the pressures formerly required. It is extremely important that fluid pressures also be lowered. Otherwise too much material per second of trigger action comes out of the gun, and the tendency of the sprayer is to deposit a heavier film on the surface than is required.

For the second group of operations it is best to start out with half the normal amount of thinner used, observe the film thickness obtained, and then further adjust the solvent content down or up to increase or decrease the amount of material de-

posited on the surface.

In the third case the number of coats required may often be reduced by replacing the solvents with heat as much as possible.

In all cases where the hot spray process is properly used, very little spray dust is blown into the booth, but one must guard against a tendency for sprayers (especially those beginning to use the process) to offset that saving by depositing a much heavier film than formerly. It is certainly not correct to assume that hot spray necessarily means a heavier film thickness. When properly controlled, any film thickness can be obtained, and overspray reduced.

Because heat is used as a viscosity reducing agent, less thinner is generally required. The exception is, as just pointed out, where a minimum film thickness is desired, in which case nearly the same amount of thinner is used in order to safeguard the tendency of the painter to spray too heavy a film. However, where the problem is to deposit a normal full coat of one mil or more, the thinner saving is an appreciable item. One material supplier shows in an analysis of hot spraying of lacquer that direct material costs are $13\frac{1}{2}\%$ lower.

As indicated on the spray chart, the amount of air required for atomization is reduced nearly in half,

which over a whole year becomes a very appreciable item of saving.

It is sometimes possible to reduce the time required for baking. This is due to the fact that the curing operation cannot start until practically all the solvents are dissipated from the film. With the hot spray process the painted article reaches the oven with a much lower thinner content, and less time is required to expel the remaining solvents. This factor seems to be more noticeable with infra-red baking.

Sprayer training required

The heated paint is much easier to atomize and the spray gun can handle a larger volume of finish per second of trigger action. This results in fewer strokes of the spray gun. In many cases criss-crossing of strokes is eliminated, and often where a sprayer formerly required ten strokes to spray a given area he will only require six or seven strokes with the hot spray.

One of the difficulties in introducing hot spray is to teach the operator to take fewer and fewer strokes with the spray gun. The natural tendency is to follow the force of habit, which must be guarded against.

With proper training of operators, those rejects attributable to improper spraying, poor covering and sags can be very greatly reduced. As an example, one large refrigerator manufacturer reports this class of rejects reduced to $\frac{1}{10}$ of the number prevailing before heaters were installed. Sags especially are reduced. It is a common tendency for good sprayers to deposit a wet film which closely approaches the sagging point. In hot spray the "wet point" is reached sooner and there is a greater margin of safety.

Effect on finish surface

characteristics

No matter what type of formula, or color of finish, there is some one ideal temperature at which the paint performs the best. At this ideal temperature the paint flows out most smoothly with the least orange peel. A smoother, less porous film struc-

to Page 74 →



→ from Page 73

ture is obtained, since there is less solvent to be expelled from the film. In most cases the smoothness and depth of film are noticeable and orange peel is reduced.

In the majority of cases, the gloss is improved proportionately to the reduction of orange peel but there are cases where the gloss is not improved at all. This no doubt occurs when the solvent balance in the finish is not correctly adjusted for hot spray.

It has often been observed that the ability of a finish to fill surface imperfections is in inverse ratio to the amount of solvent content in the wet film applied to the surface. Surface imperfections may be revealed through the cured film because of the

To properly effect the possible benefits of hot spray, intelligent, careful attention must be given to many details. Finishers must undertake to achieve these benefits with an open mind and with a consciousness that they must discard many of the habits they have acquired in their years of experience in spraying. This of course is true in undertaking any new process.

Types of paint heaters

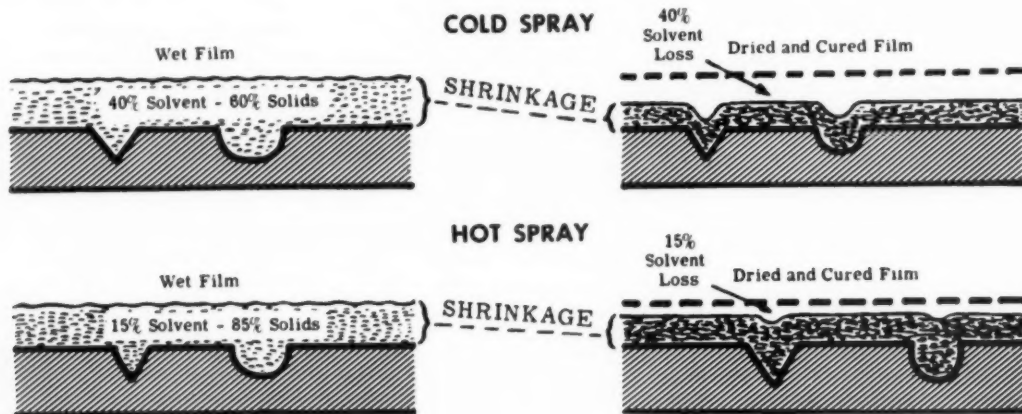
The main classifications of paint heaters are those that are circulating and non-circulating. Some also have provisions for partially heating the compressed air, taking the chill off in the winter time.

The non-circulating heater is lo-

spray gun and return. With the circulating heater more accurate temperature control can be maintained. Because of the critical viscosity action of lacquers at high temperatures it is also generally advisable to use circulating heaters for lacquer.

Heating of the air is beneficial for synthetic spraying when the air comes to the spray booth excessively cold in winter time. However, for lacquer spraying, heated air is not only unnecessary, but is considered actually detrimental.

It is very important to consider safety of construction carefully in selecting a paint heater. It is not sufficient that simply some of the electrical wiring be enclosed in the approved, explosion-proof method, but



evaporation of the solvent and consequent shrinkage in the film. Because the hot spray process deposits on the surface a film with much less solvent content, shrinkage is normally reduced and filling properties proportionately improved.

In certain areas at certain seasons of the year, lacquer sprayers experience difficulties because of blushing, a condition where moisture condenses on the freshly sprayed lacquer due to the rapid evaporation of the solvents. The usual remedy for blushing is to use expensive, slow-evaporating solvents. With the hot spray process it is virtually impossible to create a blushing condition, and it is not necessary to use expensive retarders.

It is considered that there are health advantages in that solvent fumes and spray fog are minimized.

cated very close to the spray gun. This type has no moving parts and therefore no maintenance headaches. The drawback, however, is that the paint cools off in the fluid hose from the heater to the gun. If the spraying is reasonably steady, the drop in temperature in the fluid hose can be easily compensated for by simply increasing the temperature in the heater to arrive at the desired temperature in the gun. However, where there is intermittent spraying, this cooling effect in the hose is so irregular that correct temperature control is not feasible. Also, in some cases, the fluid hose from the heater to the gun must be a long one—over 12 feet. In these cases it is better to use the circulating heater.

With the circulating type the paint is introduced to the heater by a pump which keeps the paint in motion to the

the entire device as a whole must be completely explosion-proof, and should comply fully with the electrical code for Class 1, Group D installations.

Consult your finish supplier

Any concern wishing to adopt hot spraying should obtain the full cooperation of its paint supplier in making whatever adjustments are necessary. Generally speaking, the adjustments required for synthetics are simply in the solvent addition. In the case of lacquers, it is better to have them formulated from the very beginning for hot spray. It is seldom satisfactory to take the standard material and adjust it for hot spray by juggling the solvents used. Important progress has been made recently in hot lacquer formulations which make hot spraying of lacquers a definite

to Page 76 →

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Kemclad formulations include special ingredients to protect finish against marring, chipping or scratching.



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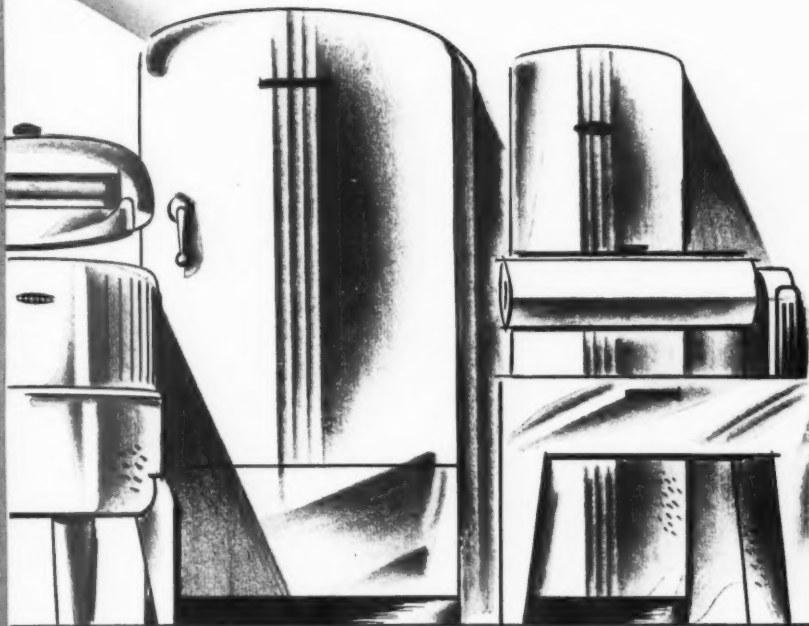
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Kemclad* Appliance Finishes are designed for one purpose only—to adapt these qualities accurately to the specific needs, design-wise, productionwise and saleswise, of appliance manufacture. They provide the high qualities of permanence and protection against abuse that are expected and demanded by today's buyers.

They offer distinct production advantages, too, in cutting down rejects. Greater hardness combined with greater flexibility enables minor defects to be easily rubbed or "dinged" out after baking, with Kemclad Finishes. At the same time, extremely high solid content with low viscosity makes possible better protection at lower cost per finished unit.

Sherwin-Williams Technical Service Engineers will be glad to advise what advantages Kemclad Finishing Systems may be able to offer in your production setup. Write today for further information. The Sherwin-Williams Co., Industrial Division, Cleveland 1, Ohio.

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APPLIANCE FINISHES

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→ from Page 74

success. In retrospect we now realize that many of our previous attempts to accomplish hot spraying of lacquers have failed because the lacquer manufacturer did not know how to make a truly good lacquer for hot spraying. In the final analysis, the paint heater is simply a device to heat paint to some given temperature. The results obtained to a great extent depend upon the formulation of the finish.

Probably the greatest benefits of all that we will derive from the hot spray process will come in the near future, as paint manufacturers become more and more experienced in hot spray formulations. This is such

a new phase of operation for the vast majority of paint chemists that additional information must be acquired before we can say that the maximum benefits of hot spraying have been achieved. Most of the present attempts in hot spraying are with formulas that were designed for room-temperature application. Every once in a while, purely by accident, we encounter a formula that produces truly marvelous benefits. After the chemists have sifted out information acquired through experience over the years, we no doubt will be able to duplicate these results consistently. The entire finishing industry will then be benefited.

Secondly, the result of their interest has been the revamping and great improvement in many of their packages as well as in their methods of packing.

Thirdly, there is a generally strong belief in the Industry that what is being done and will be done will result in the products of the Industry getting to the point of sale in much better condition and with far less loss through damage.

D. S. Hunter
Hunter-Thomas, Associates

"most scientific plan"

**National Management Committee
1949 Perfect Shipping Campaign of
the Shippers Advisory Boards**

The Safe Transit Program is the latest and biggest development of its kind. Here's a case where six of the largest industries of the country combined their experience and talents in support of what appears to me to be the most scientific plan ever devised for safeguarding shipments against the common hazards of handling in factory, warehouse and retailing, as well as in transit by all types of transportation. Many manufacturers have installed all of the recommended test equipment.

Those who have reported their experience say that damage has been reduced substantially, and the use of the test equipment has enabled them to spot faulty design or manufacturing before the product left the plant . . .

Irving M. Peters
General Chairman

Emulsion and alkaline cleaning

(Continued from Page 54)

type of metal surface or to a coating on the surface of the metal?

Much work remains to be done to determine the effect of proper cleaning in relation to the other processes in the enamel industry. As thinner enamel application come into use, a great deal more knowledge of cleaning will be needed if successful production is to be maintained.

One will note that many questions have been asked concerning cleaning problems for which I have heard

many solutions but none that were satisfactory.

I do not pose as an expert on cleaning problems but believe it is time we have some good practical methods to control or handle cleaning solutions so as to operate at peak efficiency with minimum cost.

*"A Rapid Control Method for Nickel Coatings on Enameling Iron," by L. C. Ikenberry and J. J. Canfield, of Armco Steel Corporation, presented before Enamel Division at 51st American Ceramic Society Meeting. (See Page 53, June 1949 finish.)

Adapted for finish from a talk before the Eleventh Annual Forum of the Porcelain Enamel Institute.

What they say about the Safe Transit program

(Continued from Page 51)

"should be cited for an industrial award"

**National Wooden Box Association
Washington, D. C.**

We think that your (National Safe Transit Committee) job is of such value to American industry and of such noteworthy achievement that management of the National Association of Manufacturers should cite you (the committee) for an industrial award.

We have always believed that shipping containers should not be merely a specification, but should stand on performance and yours is definitely a step toward making a container perform. After all, it is not the container that the customer is paying for.

He is paying for your product, and your good will is the factor that is at stake — and repeated business. Only through performance of containers can you expect to maintain solvency of your business.

W. N. Sardo

"great improvement in pack- ages and methods of packing"

**Enameled Utensil Manufacturers
Council
Cleveland, Ohio**

In the first place, this activity is one in which the members have taken greater and more active interest than any other activity we have ever carried on.

"we are backing it 100%"

**Geo. D. Roper Corp.
Rockford, Illinois**

We at Roper recognize that the safe transit of appliances affects everyone in the gas range industry. We feel that the program of the National Safe Transit Committee is of extreme importance to carrier, manufacturer, and customer alike, and we are backing it 100 per cent in every way possible.

Stanley H. Hobson
President

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with Century Frits
for 1950"**



It will pay you to get acquainted with these Century frits during 1950. The more familiar you become with these frit bags, and the smooth plant operation that is assured when their contents are used, the more profitable will be your enameling operations for the year.

The eighteen years' of valuable experience in both the manufacture and application of porcelain enamels back of Century means that the frits that you buy today are time-proved. They are proved for workability and smooth shop operation, and they are proved for low final cost per square foot of finished ware.

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to all Century frit customers

Start the year right by specifying "Century" frits from the steel out — ground coats that have dependable bond; cover coats that have the luster and smoothness you need; clear frits that give depth and beauty to any colored product; and acid resisting enamels that are really acid resisting. 1950 will be a "Century" year in many of the country's leading enameling plants.



CENTURY VITREOUS ENAMEL COMPANY, 6641-61 S. Narragansett Ave., Chicago 38, Ill.
finish JANUARY • 1950

Cooperative program...

→ from Page 35

The carriers program (Project II)

The carriers responsible for handling the finished products in transit, including railroads, express agency, truck lines and airlines have an important part to play in the program. In-transit research into the causes of damage, education of employees and handlers, and improvement of rolling stock are among the problems being tackled.

Industry and carriers to cooperate (Projects III and IV)

The development of recommended loading procedures and the preparation of instructional placards are being carried on by a carrier and industrial sub-committee to help reduce damage for which the loading practices are responsible.

Strictly cooperative

It should be stressed that the National Safe Transit Program is strictly a voluntary and cooperative program.

Certified Safe Transit Laboratories

Atlas Plywood Corporation
Laboratory of Research & Design
Lawrence, Massachusetts
Chicago Mill and Lumber Co.
33 South Clark Street
Chicago, Illinois
Container Laboratories, Inc.
112 West Kinzie Street
Chicago, Illinois
General Box Company
500 North Dearborn Street
Chicago, Illinois
The Hinde & Dauch Paper Co.
Sandusky, Ohio
International Paper Company
Georgetown, South Carolina
Ohio Boxboard Company
Rittman, Ohio
Packaging Service Corp.
135 Greenwood Avenue
Syncote, Pennsylvania
Don L. Quinn Company
224 West Kinzie Street
Chicago, Illinois

All of the technical work, testing and educational work required of the co-

ordinating committee is executed by the individual members on their own or their respective company's time without remuneration of any kind.

The remarkable progress of the program is attributable to the efforts of this group and the wholehearted cooperation of the representatives of the cooperating associations.

Scores of manufacturers are now using the Safe Transit pre-testing program and many are the reports of tangible results in improved packing, reduced costs and reduction in shipping losses.

Labeling program

One important cog in the Safe Transit plan is the labeling program made available to companies certifying to the use of the plan. The label serves to point out to handlers that the PACKAGED PRODUCT has been pre-tested for safe shipment. It also serves as proof to distributors and dealers that the producer is doing everything within his power to deliver the product in a salable condition.

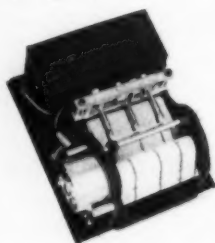
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Shock Recorder That
Puts the Finger on
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Model H

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